SCHOOL OF

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JHRP 92/2

Joint Highway Research Project

Final Report

Engineering Soils Map of Washington County, IN

Wei-Yao Chen

PURDUE UNIVERSITY

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FINAL REPORT

ENGINEERING SOILS MAP OF WASHINGTON COUNTY, INDIANA

by

Wei-Yao Chen
Research Assistant

Joint Highway Research Project

Project No.: C-36-51

File No.: 1-5-2(B)-92

Prepared as Part of an Investigation

Conducted by
Joint Highway Research Project
Engineering Experiment Station
Purdue University

in cooperation with

Indiana Department of Transportation
Indianapolis, Indiana

School of Civil Engineering
Purdue University
West Lafayette, Indiana

July 31, 1991

PURDUE UNIVERSITY

SCHOOL OF CIVIL ENGINEERING

INTERIM REPORT

To: Vincent P. Drnevich, Director
Joint Highway Research Project

January 23, 1992

From: W. F. Chen, Research Engineer
Joint Highway Research Project

Project No: C-3636U
File: 6-14-21

Attached is the second Interim Report on the HPR Part II Study entitled, "Embankment Widening and Grade Raising on Soft Foundation Soils: A Sensitivity Analysis of the Parameters for a Cap Plasticity Model". This phase was conducted by Scott J. Ludlow under the direction of Wai-Fah Chen, Philippe L. Bourdeau and C. William Lovell.

This report is forwarded for review, comment and acceptance by the INDOT and FHWA as partial fulfillment of the objectives of the research.

Respectfully submitted,

W. F. Chen
Research Engineer

WFC/vg
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Thanks are also due Professor H. L. Michael, Director, Joint Highway Research Project, and other members of the Joint Highway Research Board for their continued support of the county soil mapping project.

The substantial contributions of Dr. Arvind Chaturvedi for providing valuable discussion and opinions to the report are greatly appreciated.

The author also wishes to acknowledge D. Yang for skillfully drafting the Engineering Soil Map of Washington County and other figures included in this report, Rita Pritchett for typing the classification test results presented in Appendix A, and Will McDermott and Marian Sipes for formatting the text and final preparation of this report.

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INTRODUCTION

The engineering soils map of Washington County, Indiana which accompanies this report was prepared by airphoto interpretation techniques using accepted principles of observation and inference. The 7-inch x 9-inch aerial photographs used in this study, having an approximate scale of 1:20,000, were taken in the summer of 1938 for the United States Department of Agriculture and were purchased from that agency. The attached Engineering Soil Map was prepared at a scale ratio of 1:63,360 (1 inch = 1 mile).

Standard symbols, which were developed by the staff of the Airphoto Interpretation Laboratory of the School of Civil Engineering at Purdue University, were employed to delineate landform-parent material associations and soil textures. The text of this report represents an effort to overcome the limitations imposed by adherence to a standard symbolism and map presentation.

Extensive use was made of the Agricultural Soil Survey of Washington County published in 1988 (1). It was particularly useful as a cross-reference to check soil boundaries, and to locate gravel pits and ponds which were not present on the 1938 aerial photographs.

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* Numbers in parentheses refer to items in the list of references.

The map and report are part of a continuing effort to complete a comprehensive soil survey for the state of Indiana. Included on the map is a set of subsurface soil profiles which illustrate the approximate variation that is anticipated in each landform-parent material area. The profiles were constructed from information obtained from agricultural literature and from boring data collected from roadway and bridge site investigations (27-38). Boring locations are shown on the map. Appendix A contains a summary of classification test results for these locations.

The text of this report supplements the Engineering Soil Map. Furthermore, it includes a general description of the study area, a description of the different landform-parent material regions, and a discussion of the engineering considerations associated with the soils found in Washington County.

The predominant soils associated with each landform-parent material classification are covered in the discussion of the different landforms in the county. The physical, chemical, and engineering index properties of these soils are included in Appendices B and C.

DESCRIPTION OF THE AREA

GENERAL

Washington County is located in southern Indiana as illustrated in Figure 1, and is about midway between the eastern and western boundaries of the State. The County is bordered by eight other counties. These are Jackson County on the north, Scott County and Clark County on the east, Floyd County on the southeast, Harrison County on the south, Crawford County on the southwest, Orange County on the west, and Lawrence County on the northwest. Salem, the county seat, is located along the West Fork of Blue River in the central part of the county, approximately 83 miles south of Indianapolis.

The northern boundary of the county lies about 70 miles south of Indianapolis and the southern boundary about 30 miles north of the Ohio River. The county is about 22 miles wide (east-west) by 23 miles long (north-south) and has a land area of 330,624 acres, or 517 square miles.

Washington County is served by one railroad and by a small airport, which is located one mile west of Salem. Washington County also has about 112 miles of federal and state highways and 890 miles of all-weather county roads. Some of the county roads are paved (1).

The population of Washington County was approximately 21,920 in 1980. At that time Salem had a population of about 5,500, which is 25 % of the total population. The population of Washington County increased 8.8 percent since 1970, and this trend is expected to continue in the future. The population density in 1980 was 42 people per square mile. A population summary of the important cities and towns in the county is given in Table 1.

Farming is the leading enterprise in the county. Cash grain and livestock are the major agricultural products. The major kind of livestock is beef cattle. Woodland makes up about a third of the county. From 1969 to 1974, the acreage of cropland increased by 17.4 percent,

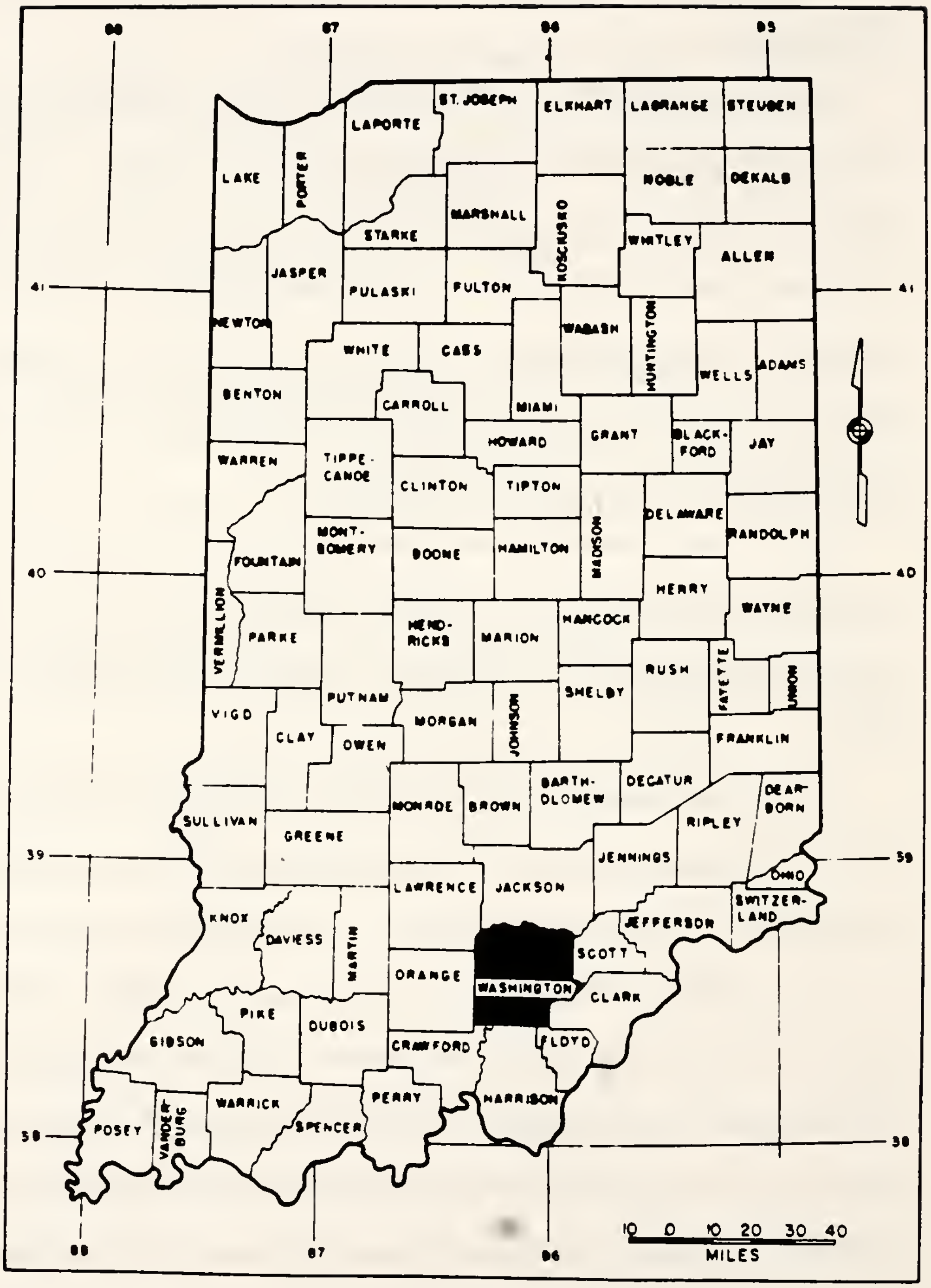

FIGURE 1. LOCATION MAP OF WASHINGTON COUNTY

that of pasture decreased by 7.6 percent, that of idle land decreased by 16.5 percent, and that of woodland decreased by 16.1 percent. This trend is expected to continue. About 7460 acres in the county, or 2 % of the total acreage, is urban or built-up lands. The acreage used for urban development is expected to increase (1).

Table 1. Population Summary of Washington County (12)

	Population		Population Change (1970 - 1980)	
City-Town	1980 Census	1970 Census	Difference	% Change
Campbelssburg	695	678	17	2.51
Fredricksburg	233	207	26	12.56
Hardinsburg	298	263	35	13.31
Little York	150	191	-41	-21.47
Livonia	120	120	—	—
New Pekin	1125	912	213	23.36
Salem	5290	5041	249	4.94
Saltillo	134	134	—	—
Urban Areas	8045	7546	499	6.61
Rural Areas	13887	11732	2155	18.37
County Total	21932	19278	2654	13.77

CLIMATE

The climate of Washington County is typically continental. The humidity is high and the temperature change is remarkable seasonally. Table 2 and 3 give data on temperature and precipitation for this area as recorded at Salem, Indiana.

In winter the average temperature is 33 degrees F, whereas the average temperature in summer is 74 degrees F. In this county, the highest and lowest recorded temperatures are 105 and -32 degrees F. The total annual precipitation is 43.35 inches, and 53 percent of this usually falls in April through September. Thunderstorms occur on about 45 days each year (1).

Table 2. Climatological Summary For Washington County (13)

Monthly statistics at Salem

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1978	TMAX	28.2	29.8	48.3	68.5	73.2	84.8	86.4	84.0	83.2	65.6	57.6	46.8
	TMIN	11.3	9.7	28.1	44.4	50.4	61.6	65.4	64.1	57.9	40.9	37.6	27.5
	PREC	4.06	0.54	3.90	3.55	5.35	1.98	7.86	5.45	1.41	3.04	4.47	6.57
	SNOW	23.5	3.6	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979	TMAX	29.9	35.5	57.6	64.3	75.0	84.2	83.3	83.9	78.4	67.9	55.1	46.8
	TMIN	12.5	14.6	36.0	41.8	49.7	60.2	64.1	63.5	54.5	44.7	33.6	28.5
	PREC	4.41	5.07	3.83	5.58	3.85	4.66	7.89	5.27	4.33	1.92	7.81	3.15
	SNOW	17.8	11.5	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0
1980	TMAX	38.8	36.5	48.9	63.9	76.6	83.9	91.3	90.5	81.9	67.4	53.6	44.4
	TMIN	24.3	17.2	29.4	39.8	53.0	59.1	67.5	67.5	58.5	40.1	32.5	26.9
	PREC	3.08	1.30	5.63	2.97	3.75	4.03	5.11	2.96	2.44	2.67	2.25	1.30
	SNOW	9.0	6.5	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.0
1981	TMAX	36.7	48.4	55.3	72.7	71.7	85.1	86.8	84.4	77.3	67.1	56.9	40.2
	TMIN	17.7	25.2	30.1	48.6	49.3	63.6	66.1	62.3	53.9	43.6	34.7	22.9
	PREC	0.57	3.03	2.51	6.07	5.52	3.64	2.60	3.53	3.71	3.01	2.21	3.34
	SNOW	2.5	2.3	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	9.5
1982	TMAX	35.5	42.6	59.0	62.7	82.1	80.2	86.9	83.8	77.2	71.7	57.0	52.0
	TMIN	15.4	22.7	33.1	37.9	54.9	56.9	65.1	59.9	55.0	44.2	37.8	35.8
	PREC	9.48	1.58	4.81	2.98	4.88	4.57	2.92	5.33	5.08	3.61	4.95	5.78
	SNOW	10.0	8.0	0.8	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983	TMAX	41.0	48.4	56.2	61.0	73.1	85.1	93.0	92.5	82.3	68.6	57.6	34.3
	TMIN	26.5	25.8	34.5	40.3	47.2	58.4	66.4	66.5	55.8	47.3	37.0	17.0
	PREC	1.45	0.77	2.08	7.85	9.18	2.55	1.18	5.27	2.33	9.13	5.33	3.66
	SNOW	1.9	2.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
1984	TMAX	35.0	52.0	47.5	64.4	72.9	86.8	84.6	86.3	78.5	71.4	54.4	52.3
	TMIN	18.0	28.9	29.4	42.4	49.5	63.0	60.7	62.9	53.6	53.2	32.6	34.2
	PREC	0.94	1.18	4.10	6.12	5.41	1.01	3.95	0.88	1.98	2.61	5.26	5.00
	SNOW	8.6	5.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8
1985	TMAX	30.5	38.6	59.3	70.7	75.8	80.8	85.6	82.5	79.4	70.1	59.1	37.9
	TMIN	15.9	20.0	37.5	46.0	54.6	59.3	63.9	62.5	53.4	49.8	43.8	19.9
	PREC	2.27	1.76	7.69	1.18	5.64	7.77	4.51	7.67	0.80	3.56	7.48	1.70
	SNOW	10.9	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4
1986	TMAX	43.7	45.2	59.2	70.6	76.2	84.9	87.7	83.1	81.8	67.9	51.3	42.6
	TMIN	22.0	28.4	35.5	43.5	54.9	63.2	67.1	59.1	60.6	46.6	36.7	27.1
	PREC	1.25	4.47	3.45	2.20	1.68	2.41	6.70	2.96	4.12	4.91	3.81	2.18
	SNOW	0.0	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987	TMAX	38.5	46.9	58.6	65.9	82.2	84.4	87.3	88.6	82.2	64.0	61.2	46.1
	TMIN	24.4	28.2	34.7	40.7	55.6	62.3	65.8	63.6	55.1	37.2	37.4	30.2
	PREC	0.92	5.11	1.66	1.50	2.55	4.13	3.96	0.56	1.82	1.19	2.63	3.98
	SNOW	2.8	2.6	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
1988	TMAX	38.5	43.1	55.8	68.8	78.7	90.0	90.4	88.2	78.7	61.3	56.2	46.4
	TMIN	24.4	22.7	33.5	40.2	49.3	56.6	65.4	65.4	56.0	36.8	35.2	25.1
	PREC	0.92	5.49	3.70	2.66	0.97	0.46	11.16	1.38	5.00	2.85	5.46	2.40
	SNOW	2.8	8.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5

Average seasonal rainfall is about 19 inches. On the average, 12 days of the year have at least one inch of snow on the ground. The prevailing wind is from the south-southwest with the highest average windspeed, 10 miles per hour, occurring in spring.

Table 3. Twenty-Eight Year Normal Climate Data (1)
(recorded in the period 1951-78 at Salem, Indiana)

For The Period 1951-78				
	Temperature (F)			Average Precipitaion
MONTH	Average Daily maximum	Average daily minimum	Average	(inches)
January	40.5	21.5	31.1	3.43
February	44.6	23.9	34.3	3.13
March	54.2	32.0	43.1	4.56
April	67.5	43.0	55.3	4.06
May	76.0	50.9	63.5	4.36
June	84.6	60.0	72.3	3.99
July	87.5	63.5	75.5	4.59
August	86.5	61.2	73.8	3.05
September	81.3	54.8	68.1	2.87
Ovtober	69.8	43.1	56.5	2.52
November	54.8	33.7	44.3	3.19
December	44.1	26.0	35.0	3.60
Annual	44.1	26.0	35.0	–

DRAINAGE FEATURES

Drainage features of Washington County are shown in Figure 2, Drainage Map – Washington County, Indiana, prepared by the Joint Highway Research Project, Purdue University, 1952. The county is drained by four river systems, principally the three Forks of Blue River. The northern and eastern parts are drained by the East Fork of White River either directly or by way of the tributary Muscatatuck River and its branches; a small area in the western part is drained by the headwater branches of Lost River, which also eventually flows into the East Fork; and a very small area in the southeastern part (three square miles) is drained

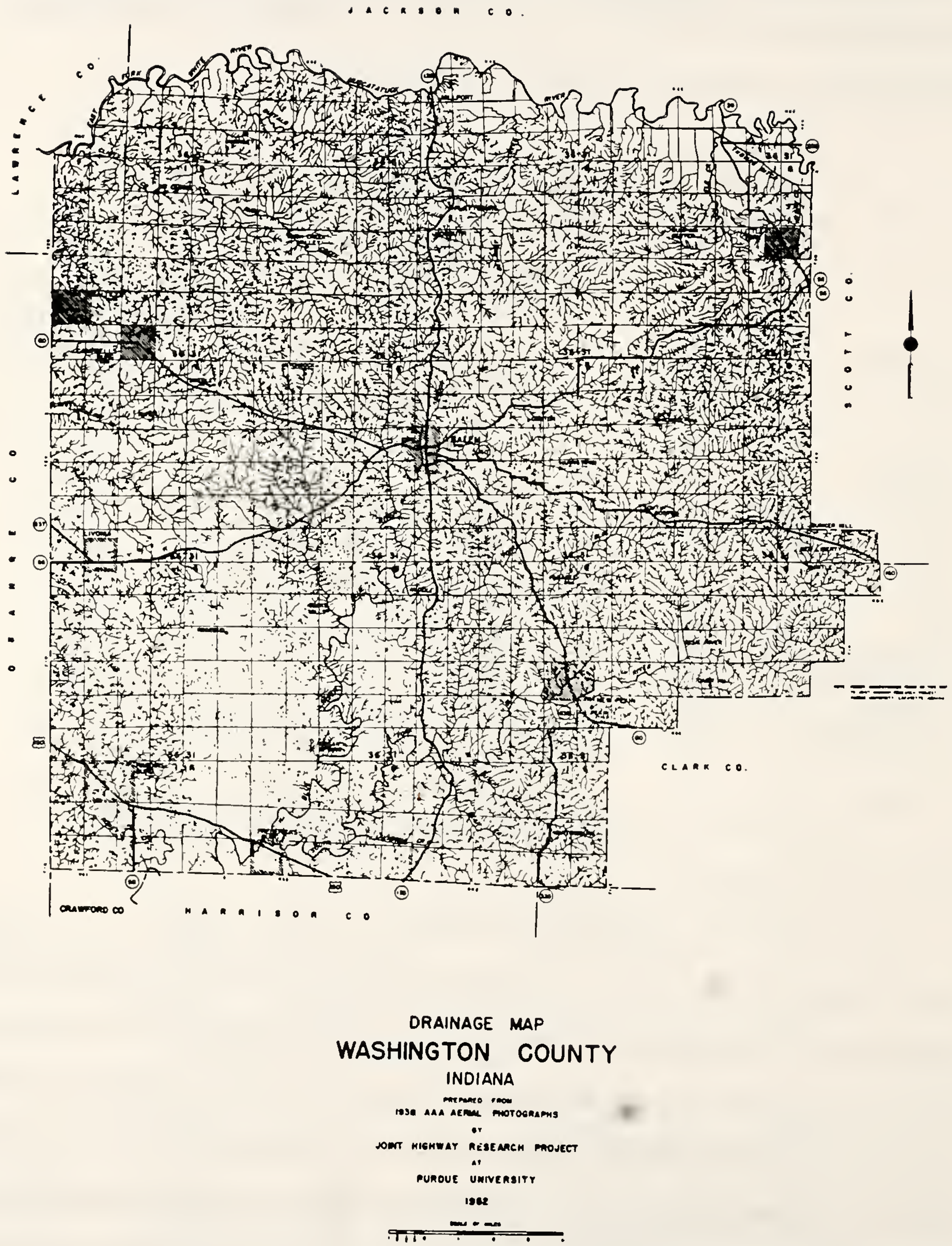

FIGURE 2. DRAINAGE MAP OF WASHINGTON COUNTY (14)

by the headwater branches of the Muddy Fork of Silver Creek. The rest of the surface water in the county drains to the southwest through the three Forks of Blue River (see Figure 2).

The waters of Lost River and the East Fork of White River empty into the Wabash River to the west, and then into the Ohio River, whereas the waters of the Blue River and the Muddy Fork of Silver Creek empty directly into the Ohio River to the south (2). Numerous sinkholes occur in the southern and northwestern parts of the county. Surface water enters the sinkholes and drains through caves into some of the streams.

WATER SUPPLY

The water resources are very limited in Washington County. Washington County lies within two watersheds of Indiana as shown in Figure 3. The northern part belongs to East Fork of White River watershed, whereas the southern part belongs to the Minor Ohio River watershed. For surface water supply, only the East Fork of White River, the Muscatatuck River, and the lower waters of the Blue River system are large enough to provide supplies of municipal and industrial water throughout the year.

Groundwater is another source of water supply. Washington County is located in two groundwater sections. They are Devonian and Mississippian Siltstone and Shales Section and Mississippian Limestone Section (See Figure 4). Wells are driven to obtain reliable water supply in most places. In most wells driven in bedrock, water is probably derived from bedding-plane or lithologic-boundary aquifers. In general, the rocks of the Borden Group are poor aquifers. However, one of the most reliable bedrock aquifers is the zone of contact between Borden and Harrodsburg rocks. (Please refer to the section on Bedrock Geology for the description of these bedrocks.)

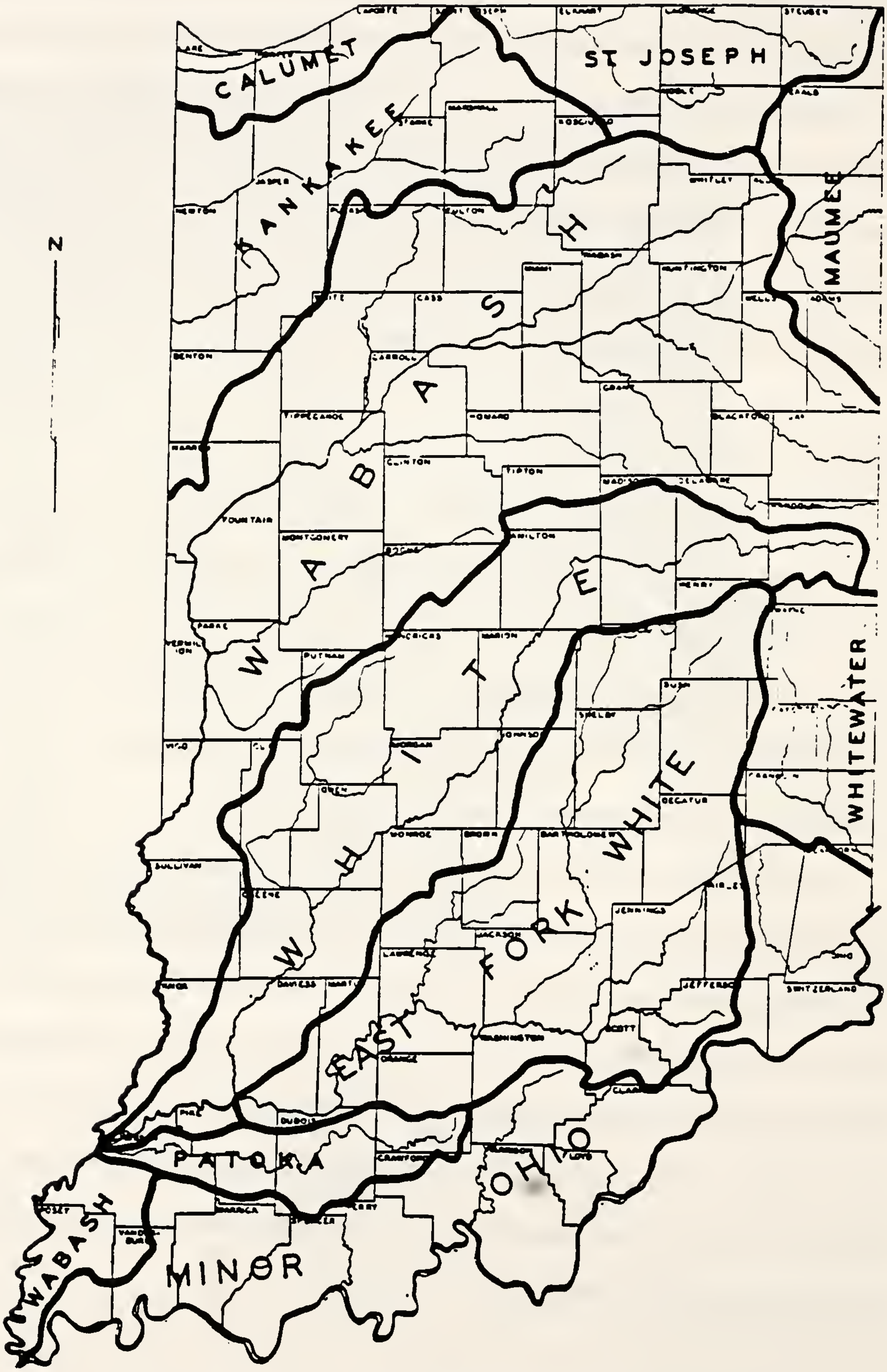

FIGURE 3. MAJOR WATERSHEDS OF INDIANA (15)

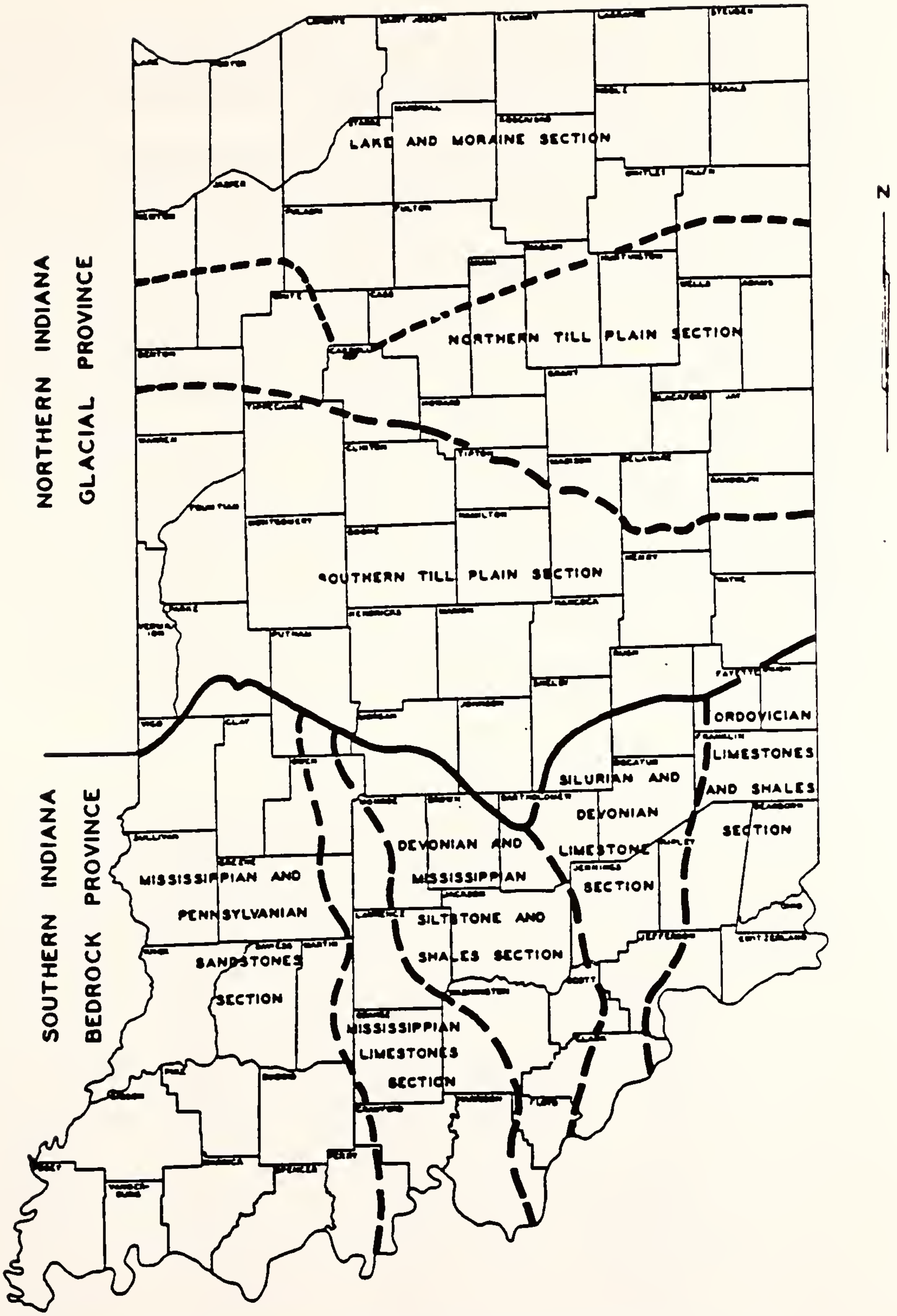

FIGURE 4. GROUNDWATER SECTIONS OF INDIANA (15)

In addition, large quantities of water are stored in some sand and gravel aquifers. The deposit of sand and gravel in the valley of the East Fork of White River probably is the largest ground-water aquifer in Washington County. This deposit, 75 feet thick or more, could yield enough water for industrial, municipal, and domestic use of the surrounding areas.

Although underground water is available in some areas, the water supply is still a major problem in most of the county. Ponds and springs are used as a source of water in many places, but they dry up or stop during periods of drought. In areas of karst topography, soils are underlain by cavernous limestone and are subject to seepage. Therefore, they are not suitable for new ponds. Also, sinkhole ponds in this area are only temporary. On the other hand, lakes and ponds whose floors and sides are of rocks of the Borden Group probably will retain water with very little leakage. At the town of Salem, water is obtained from Lake Salinda and Lake John Hay. The water use summary for Washington County in 1989 is shown in Table 4.

Table 4. Water Use Summary for Washington County (16)
(1989 usage in millions of gallons)

MONTH	SOURCE		
	Ground	Surface	Total
January	1.84	90.60	92.43
February	1.45	81.35	82.80
March	1.92	87.65	89.57
April	1.96	73.33	75.29
May	1.96	84.80	86.76
June	2.29	73.69	75.98
July	2.70	67.99	70.68
August	2.13	91.97	94.10
September	2.44	59.17	61.61
October	4.71	53.82	58.53
November	3.01	56.26	59.27
December	3.29	54.15	57.44
Total	29.70	874.76	904.46

PHYSIOGRAPHY

The State of Indiana can be divided into nine physiographic regions based on surface topographic features. Washington County contains parts of four of these sections: the Scottsburg Lowland, the Norman Upland, the Mitchell Plain, and the Crawford Upland (2). The Scottsburg Lowland occurs in the form of a narrow strip, that is characterized by long, sloping valleys along the streams and a notable lack of steep hills. The Norman Upland is predominantly of sandstone origin and has a rolling and dissected surface. The topography of the Mitchell Plain has two unique features, namely rounded hills and sinkholes. Ponds are also seen due to the temporary blockage of sinkholes. The Crawford Upland is also of sandstone and shale origin. It is dissected and severely weathered (3). These regional physiographic units are illustrated in Figures 5 and 6. With relation to its physiographic situation in the United States, Washington County is a part of the Low Plateau Province.

TOPOGRAPHY

There are 17 quadrangle maps in the USGS 7 1/2-minute series that provide topographic coverage for Washington County. They are the Becks Mill, Borden, Campbellsburg, Fredericksburg, Hardinsburg, Henryville, Kossuth, Little York, Livonia, Medora, Palmyra, Salem, Smedley, South Boston, Tampica, Tunnelton, and Vallonia Quadrangles.

The general topography of Washington County is shown in Figure 7. Most of the soil in Washington County is on uplands and is moderately sloping to very steep. The soils on terraces and flood plains generally are nearly level or gently sloping. The highest point of Washington County reaches 1050 feet above sea level, which is an area of Franklin Township about 0.5 mile south of State Highway 56 and one mile northwest of New Philadelphia. The minimum altitude in the county is less than 490 feet above sea level. It is in an area of Brown Township where the East Fork of the White River leaves the northwest corner of the county (1).

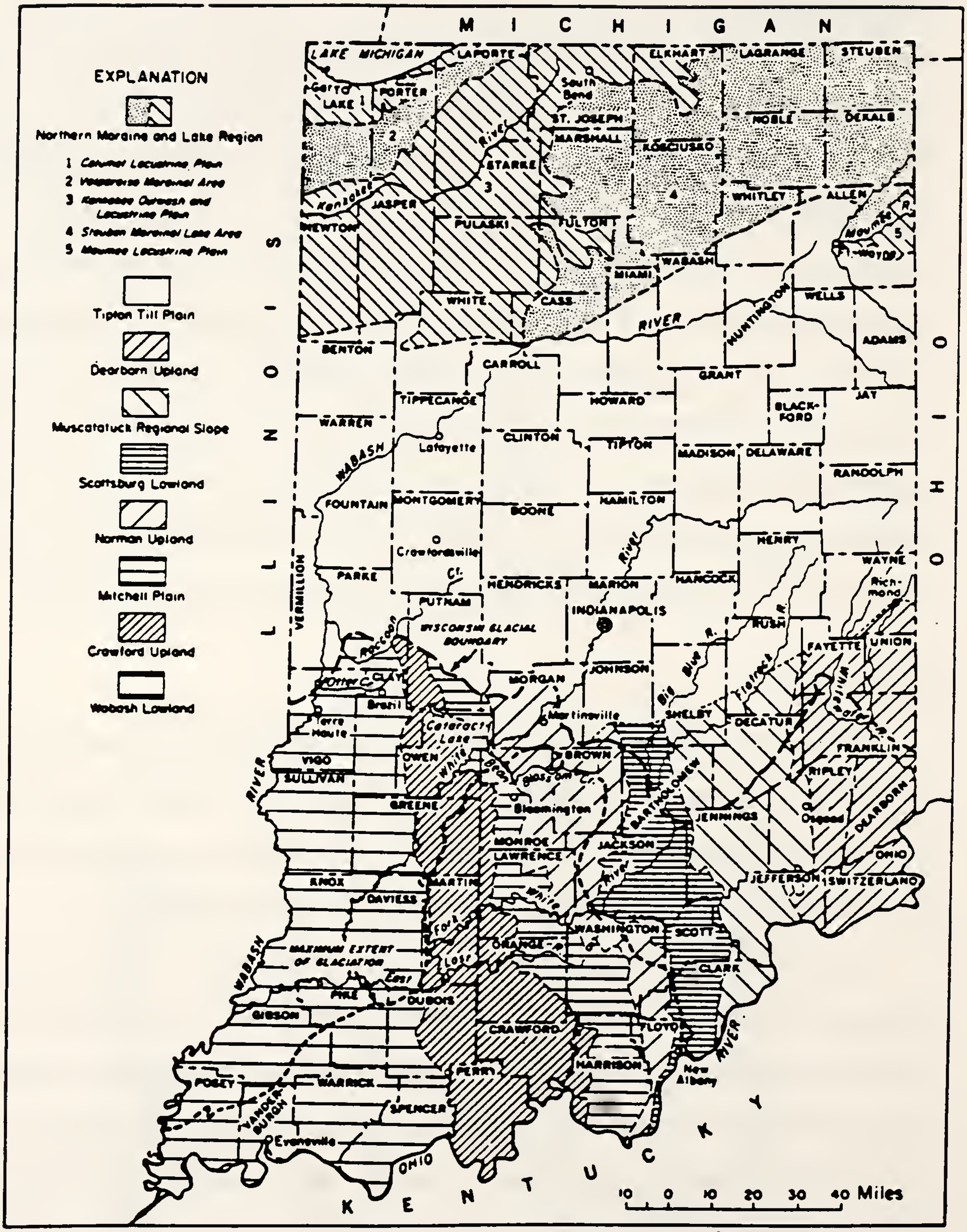

FIGURE 5. PHYSIOGRAPHIC UNITS AND GLACIAL BOUNDARIES IN INDIANA (17)

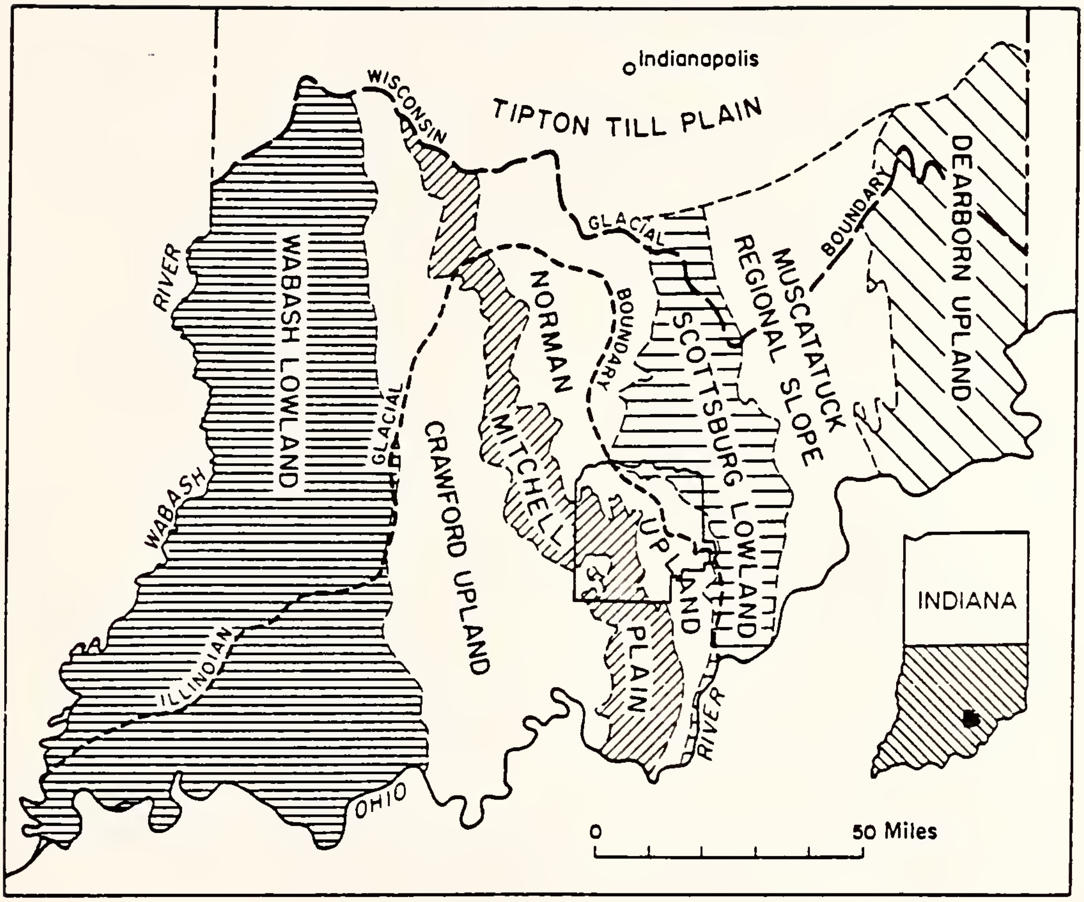

FIGURE 6. MAP OF SOUTHERN INDIANA SHOWING LOCATION OF WASHINGTON COUNTY IN RELATION TO REGIONAL PHYSIOGRAPHIC UNITS (2)

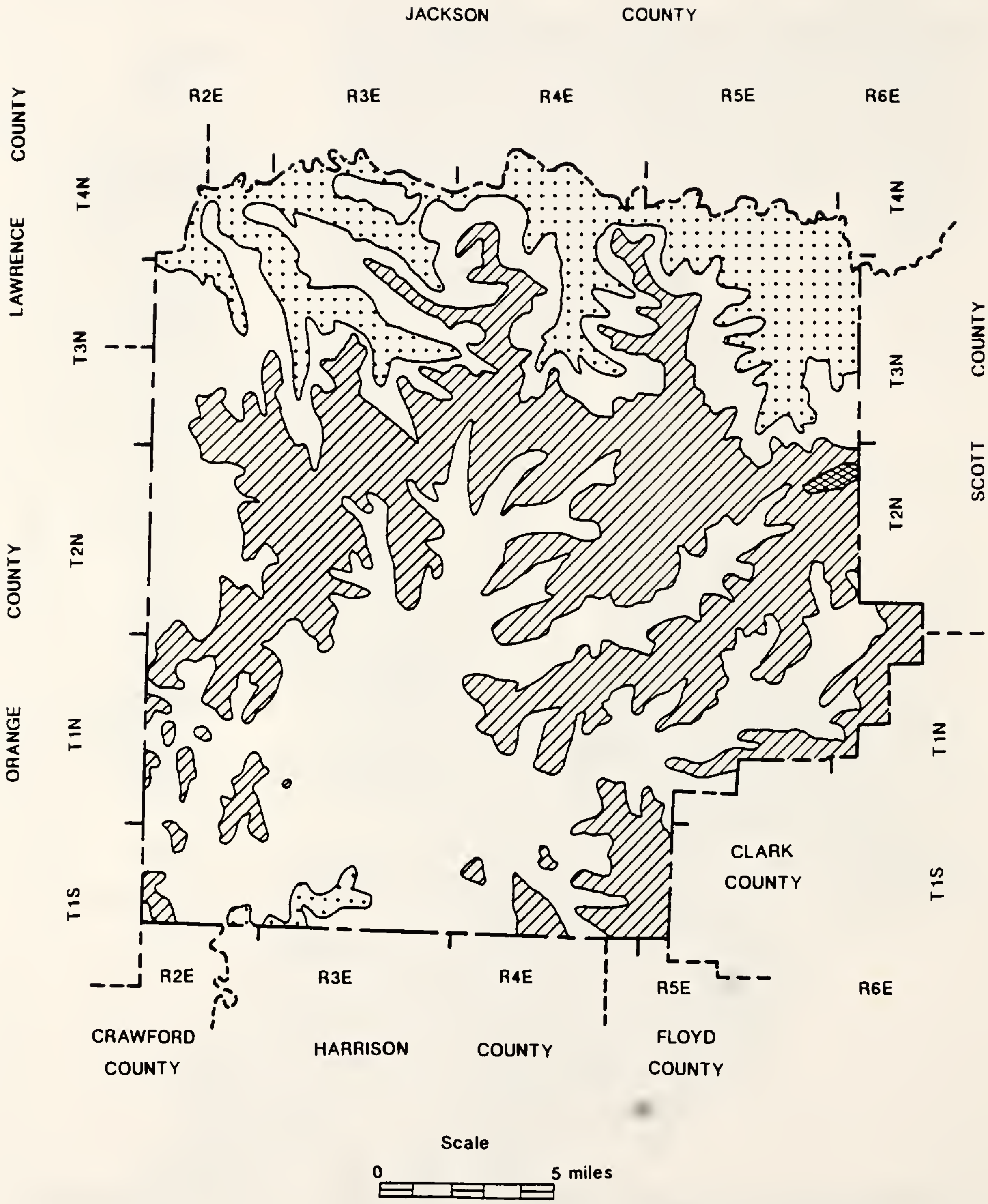

FIGURE 7. TOPOGRAPHIC MAP OF WASHINGTON COUNTY (18, 19)

EXPLANATOIN

Elevation Range In Feet

Contour Interval = 200 Feet

<600

600 - 800

800 - 1000

>1000

FIGURE 7. TOPOGRAPHIC MAP OF WASHINGTON COUNTY (18. 19)

(CONTINUED)

GEOLOGY OF WASHINGTON COUNTY

Washington County lies largely within the unglaciated area of the State; only a small area in the northeastern part of the county is covered with glacial drift (4). Washington County is located on the west flank of the Cincinnati Arch, between the arch and the deepest part of the Illinois Basin (Figure 8). Thus, most of the rocks of the county dip west-southwestward toward the basin. The regional dip is about 25 to 30 feet per mile (less than a third of a degree). However, the direction and magnitude of dip will vary in places; sometimes the direction even reverses due to anticlinal structures.

The surface deposits of Washington County are composed of bedrock of Mississippian age (Figure 9), and unconsolidated materials of the Tertiary and Quaternary periods. The bedrock in northern, northeastern, and eastern parts of the county are covered by till, sand and gravel deposited by Illinoian glaciers during the Pleistocene Epoch. During Wisconsinan times, outwash from glaciers entered the northern part of the county and formed a valley train in the East Fork (and tributaries) of White River. Finally, deposits of alluvium of Recent age ranging from a few feet to a few tens of feet covered most of the lake deposits and the valley bottoms of the county. These deposits consist mainly of clay, silt, sand and gravel.

Most of Washington County is covered by residual soils developed on bedrock. The oldest rocks exposed are those near the base of the Mississippian section.

The Mt. Carmel Fault which crosses the northern boundary of the county is the notable structural feature of Washington County. It probably formed in the early stages of formation of the Cincinnati Arch and the Illinois Basin. It is a normal dip-slip fault with an approximate dip of W. The eastern block is upthrown with respect to the western side. Vertical displacement is estimated to be between 80 and 175 feet. No movement has been recorded

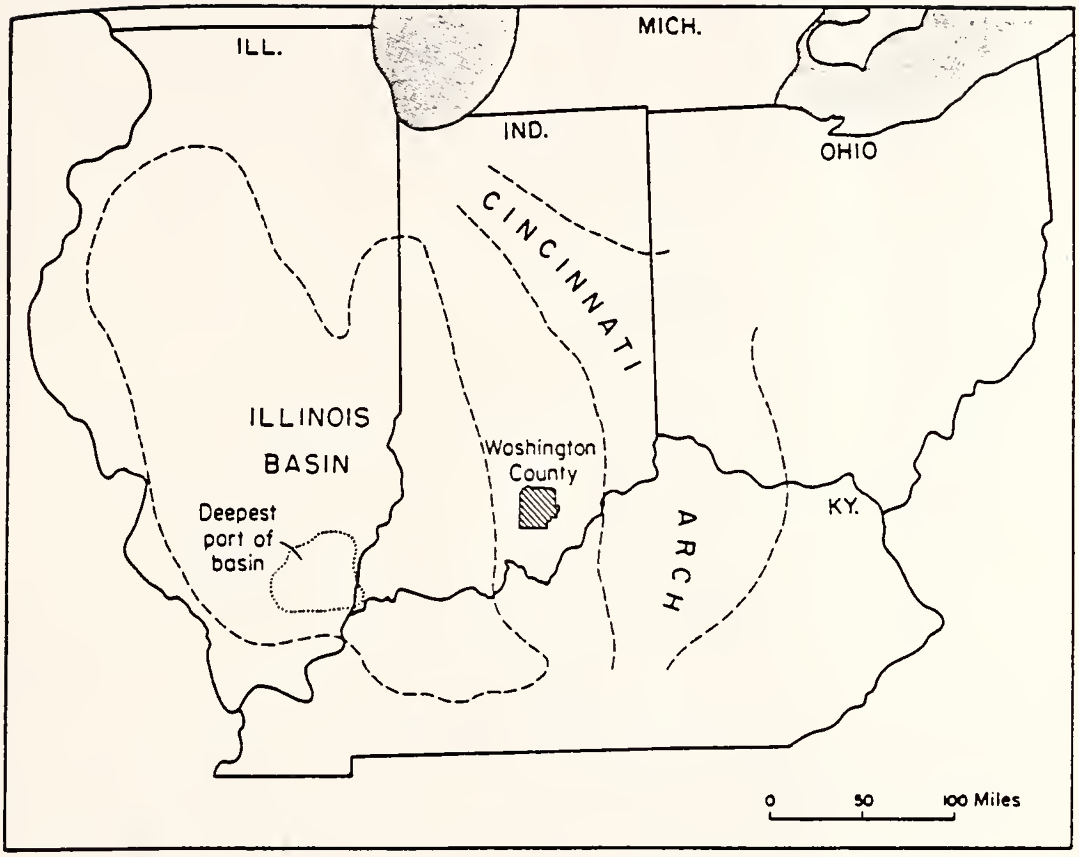

FIGURE 8. MAP SHOWING POSITON OF WASHINGTON COUNTY IN RELATION TO THE ILLINOIS BASIN AND THE CINCINNATI ARCH (2)

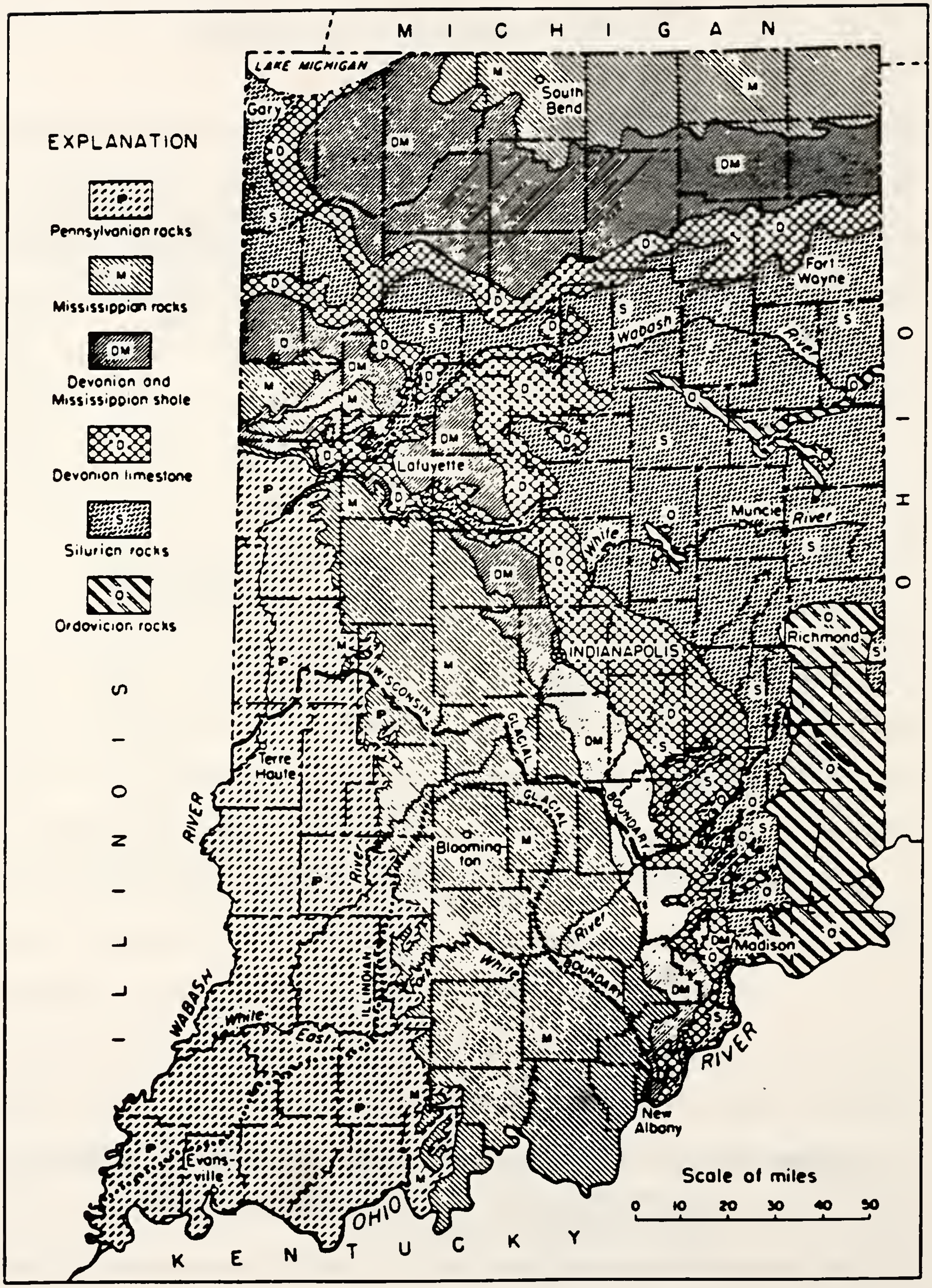

FIGURE 9. BEDROCK GEOLOGY OF INDIANA (20)

along this fault in historical time and, indeed, no indication exists of post-Paleozoic movement (5). The fault is no longer active and represents no seismic hazard to the area (6).

BEDROCK GEOLOGY

The bedrocks of the Washington County lie entirely within the Mississippian System as shown in Figure 10. This figure illustrates the disposition of the bedrock units as they would appear today if there were no unconsolidated deposits present to cover them up. They contain exposed formations ranging from the Borden Group (early-middle Mississippian) to the West Baden Group (late Mississippian).

Near the base of the Mississippian System is the Borden Group. It is named for the town of Borden in Clark County, and consists primarily of gray argillaceous shales and siltstones and some thin limestones and thin fine-grained sandstones. Rocks belong to the Borden Group are found in the eastern and northern parts of Washington County. The group is only 600 feet thick in Washington County, about 300 feet of which is exposed at the surface (2).

Sanders Group, consisting mostly of coarse-grained fossiliferous limestone, overlies the Borden Group. It is found in a curvilinear belt extending from the southeast to the northwest part of the county. The Sanders Group consists of the Harrodsburg Limestone in its upper part and the Salem Limestone in its lower part. The Harrodsburg Limestone, 60 to 80 feet thick in Washington County, was named for the town of Harrodsburg of Monroe County, whereas the Salem Limestone was named after the town of Salem, Washington County. Within Indiana, the outcrop belt of the Salem Limestone extends from the bluff of the Ohio Valley northward through Washington County (7). The Salem Limestone is 60-90 feet thick in Washington County, and has been used commercially for building stone in Washington County as well as in Lawrence and Monroe Counties.

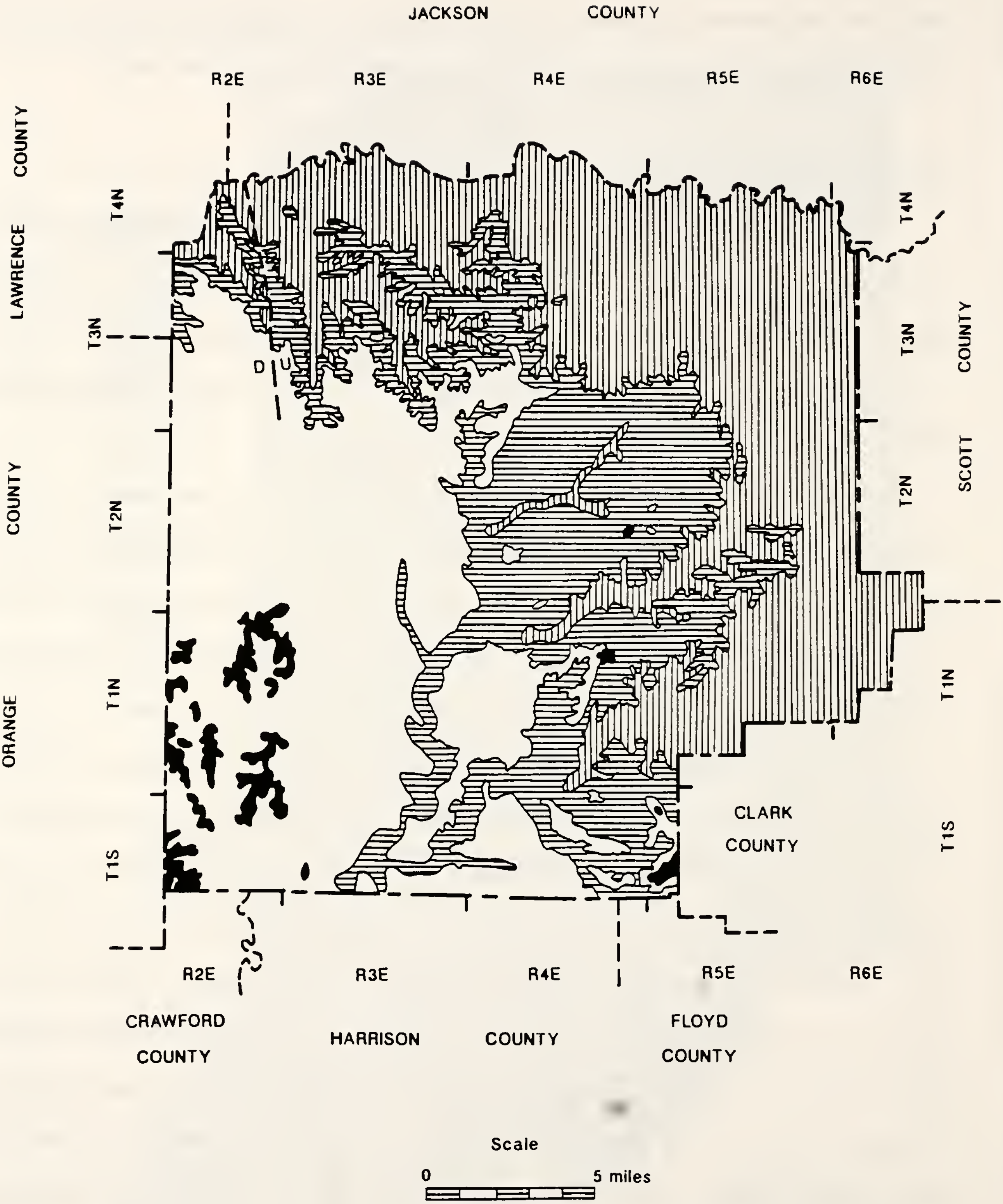

FIGURE 10. BEDROCK GEOLOGY OF WASHINGTON COUNTY (21, 22)

EXPLANATION

Mississippian

West Baden Group - Shale, Sandstone, and Limestone; Isolated Deposits are Semiconsolidated Sand

Blue River Group - Mostly Fine-grained Limestone

Sanders Group - Mostly Coarse-grained Fossiliferous Limestone

Borden Group - Siltstone, Shale, Sandstone, and Some Limestone

U D

Mount Carmel Fault - U = Upthrown Side; D = Downthrown Side

FIGURE 10. BEDROCK GEOLOGY OF WASHINGTON COUNTY (21, 22)

(CONTINUED)

Overlying the Sanders Group is the Blue River Group. The Blue River Group, named for the Blue River, comprises the bedrock in the western and southern parts of Washington County. It is mostly fine-grained limestone and has a thickness of 275 feet (2).

The Blue River Group is composed of three formations: the St. Louis Limestone, the Ste. Genevieve Limestone, and the Paoli Limestone, in ascending order. Among them, the St. Louis Limestone is more susceptible to solution by ground water than most other formations in Washington County. In the regions underlain by the soluble St. Louis Limestone, undulating karst topography is well developed, and numerous sinkholes are common. Also in this region, most of the water is drained by underground streams flowing through cavernous limestone.

Finally, the West Baden Group, named after the town of West Baden in Orange County, overlies the Blue River Group. It contains an alternating sequence of relatively thin sandstones, shales, and limestones. The Group is present in the southwest corner of the county as well as in some isolated spots in the central part of the county. A few sinkholes exist in the southwest corner, and they are considered to be reflection of subsurface solution features developed in the underlying older limestones (2).

The bedrock topography of Washington County is shown in Figure 11. The lowest bedrock altitude exists in the northern part of the county, which corresponds to the East Fork of White River and the tributary Muscatatuck River. The valley is now an extensive plain, and has been filled with Kansan, Illinoian and Wisconsin glacial outwash and Recent nonglacial stream alluvium.

In the central and southern parts of Washington County, the channel of the Blue River may cut down as much as 100 feet or more into the surrounding bedrock. In some places along the Middle and South Forks of Blue River, bedrock thinly covered by a few feet of glacial

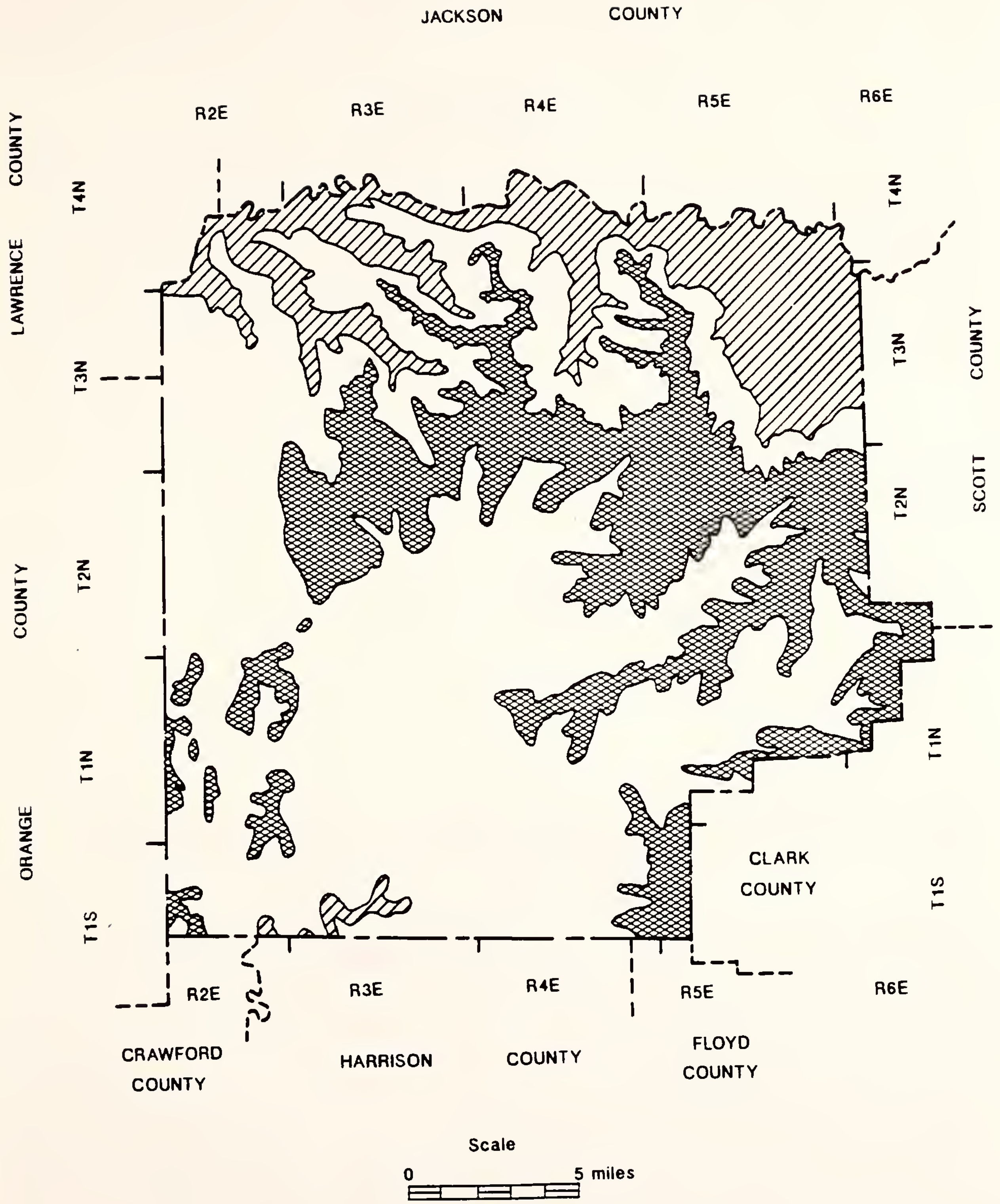

FIGURE 11. BEDROCK TOPOGRAPHY OF WASHINGTON COUNTY (23)

EXPLANATION

Elevation Range in Feet

Contour interval = 200 Feet

<600

600 - 800

>800

FIGURE 11. BEDROCK TOPOGRAPHY OF WASHINGTON COUNTY (23)

(CONTINUED)

material is found under terrace surfaces. Thus, bedrock benches are found here at about the same level as valley-train terraces (2).

TERTIARY AND QUATERNARY GEOLOGY

The unconsolidated deposits of Washington County are illustrated in Figure 12. The unconsolidated sediments in Washington County are of the Tertiary and Quaternary Systems. The glacial drift of Illinoian and Wisconsin ages is present in the north and east, whereas residual soils of Tertiary to Quaternary period are present in the west and south. Recent alluvium is also found in most stream valleys.

Most of the deposits of Tertiary age in Washington County are residual soils. However, the depositional timespan of these soils may range from early Tertiary to Recent. Weathering of bedrock and deposition of rock residue is the main reason for the formation of these residual soils. The red clay found in these residual soils probably is the residuum of decomposed Mississippian argillaceous limestone, whereas the sands are probably derived from the sandstones in West Baden Group (2).

The unconsolidated deposits of the Quaternary Period in Washington County include sediments of Illinoian, Wisconsin, and Recent ages. The Illinoian and Wisconsin glacial boundaries are shown previously in Figure 6.

The Illinoian glacial boundary extends into the northern and eastern parts of Washington County. As shown in Figure 12, sediments of Illinoian age are found in the northeast corner of Washington County as surface deposits (or under the surface deposits) on the flood plain of the Muscatatuck River and its tributaries. They consist of two parts: tills and drifts of Jessup Formation, and lake clay, silt and sand of the Lacustrine Facies of Atherton Formation. The thickness of this layer may be as much as 100 feet in some places. Besides, many of the stream

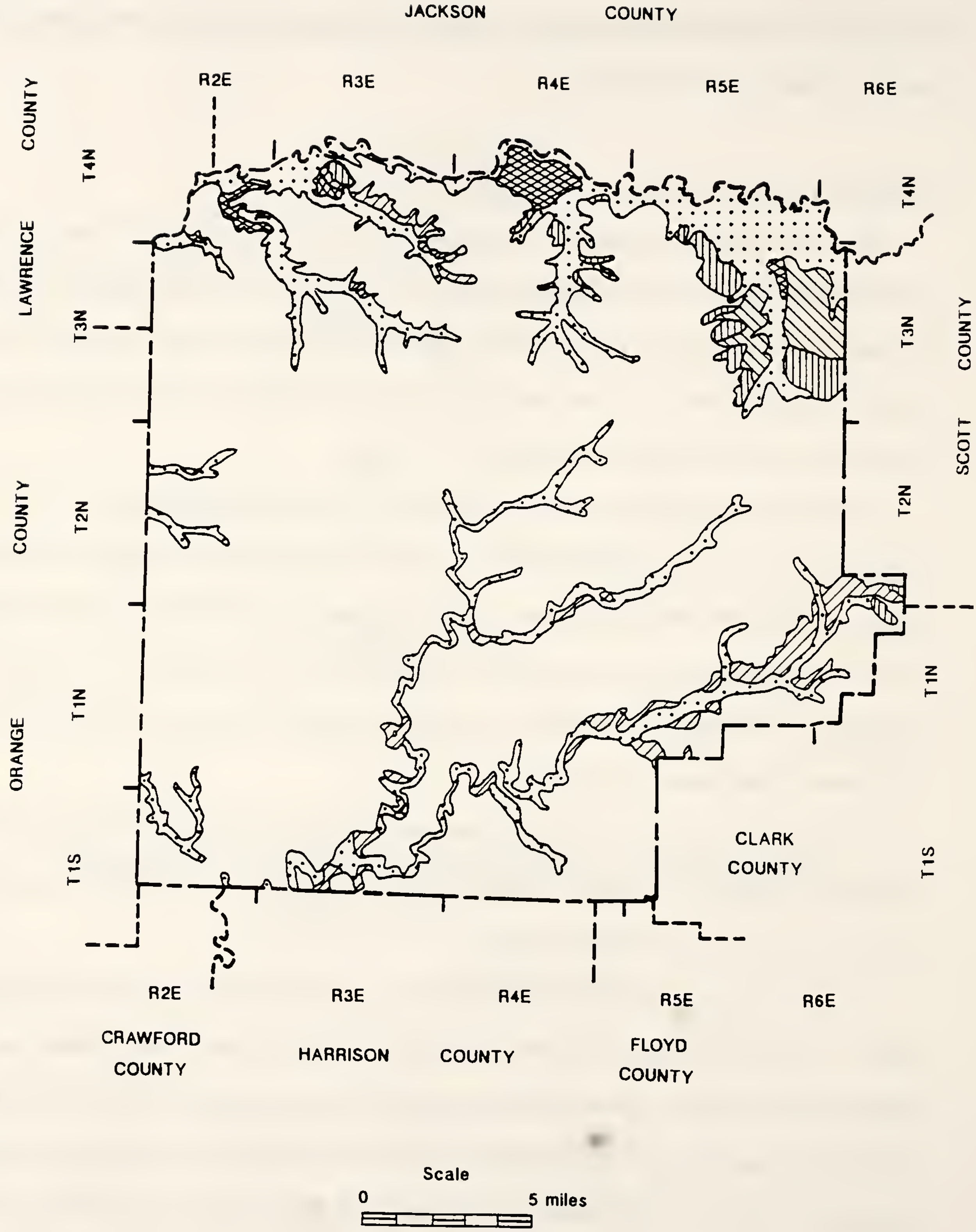

FIGURE 12. UNCONSOLIDATED DEPOSITS OF WASHINGTON COUNTY (24, 25)

EXPLANATION

Recent	Silt, Sand, and Gravel - Mostly Alluvium, but Includes Some Colluvial and Paludal Deposits. Martinsville Formation in Indiana
Illinoian and Wisconsinan	Clay, Silt, and Sand - Lacustrine Deposits. Lacustrine Facies of Atherton Formation in Indiana
Illinoian and Older	Silt, Sand, and Gravel - Mostly Alluvium, but Includes Some Colluvial and Lacustrine Deposits. Prospect Formation in Indiana
	Silt, Clay, and Sand - Lacustrine Deposits and Washed Till. Lacustrine Facies of Atherton Formation
	Till - Includes Some Ice - Contact Stratified Drift. Major part of Jessup Formation in Indiana
	Residual Soils Developed on Bedrock

FIGURE 12. UNCONSOLIDATED DEPOSITS OF WASHINGTON COUNTY (24, 25)

(CONTINUED)

valleys in the county, especially the Upper Forks of Blue River and the tributaries of the East Fork of White River are underlain by alluvial silt, sand and gravels, which are classified as Prospect Formation in Indiana (2). For example, the South Fork of Blue River contains some valley-train material, and scattered glacial pebbles are found in the streambeds of the other two Forks of Blue River.

As shown in Figure 6, the Wisconsinan glaciation did not extend as far south as Washington County. However, in Wisconsin time and pre-Wisconsin time the East Fork served as a meltwater channel, and thus is filled with outwash deposits consisting of clay, sand, and silt to depths of 50 to 100 feet. Outwash of Illinoian and older material may be preserved under these deposits; however, much of the pre-Wisconsin glacial sediments have probably been stripped away by erosion before Wisconsin age (2).

During Wisconsin time the valley-train built up in the East Fork of White River served as a dam to the incoming Muscatatuck River and other branches. Thus the Muscatatuck River and other tributaries are ponded. The lake deposits of Muscatatuck River valley are 40 to 70 feet thick (2).

There are also sand dunes of Wisconsin age found in the northern part of the county along the banks of East Fork and some of its tributaries. Sand also occurs as a thin veneer over terraces in many places. Loess of Wisconsin age is also very common in Washington County.

Among the Recent age sediments flood-plain silts, sands and clays cover most of the stream valleys of Washington County. In the northern part, alluvium of Recent Age ranging from 10 to 25 in thickness covers most valley-train deposits of the East Fork and the lake deposits of the Muscatatuck River. In the southern part of the county, stream gravels and flood-plain clays and silts also filled the Blue River and its three branches. The thickness of these deposits varies from place to place (2). The total thickness of unconsolidated deposits

in Washington County is shown in Figure 13. It can be seen that the thickness is less than 50 feet in most parts of the county. However, the thickness may reach 150 feet along the northern border of the county, that is along the East Fork valley and the Muscatatuck River valley.

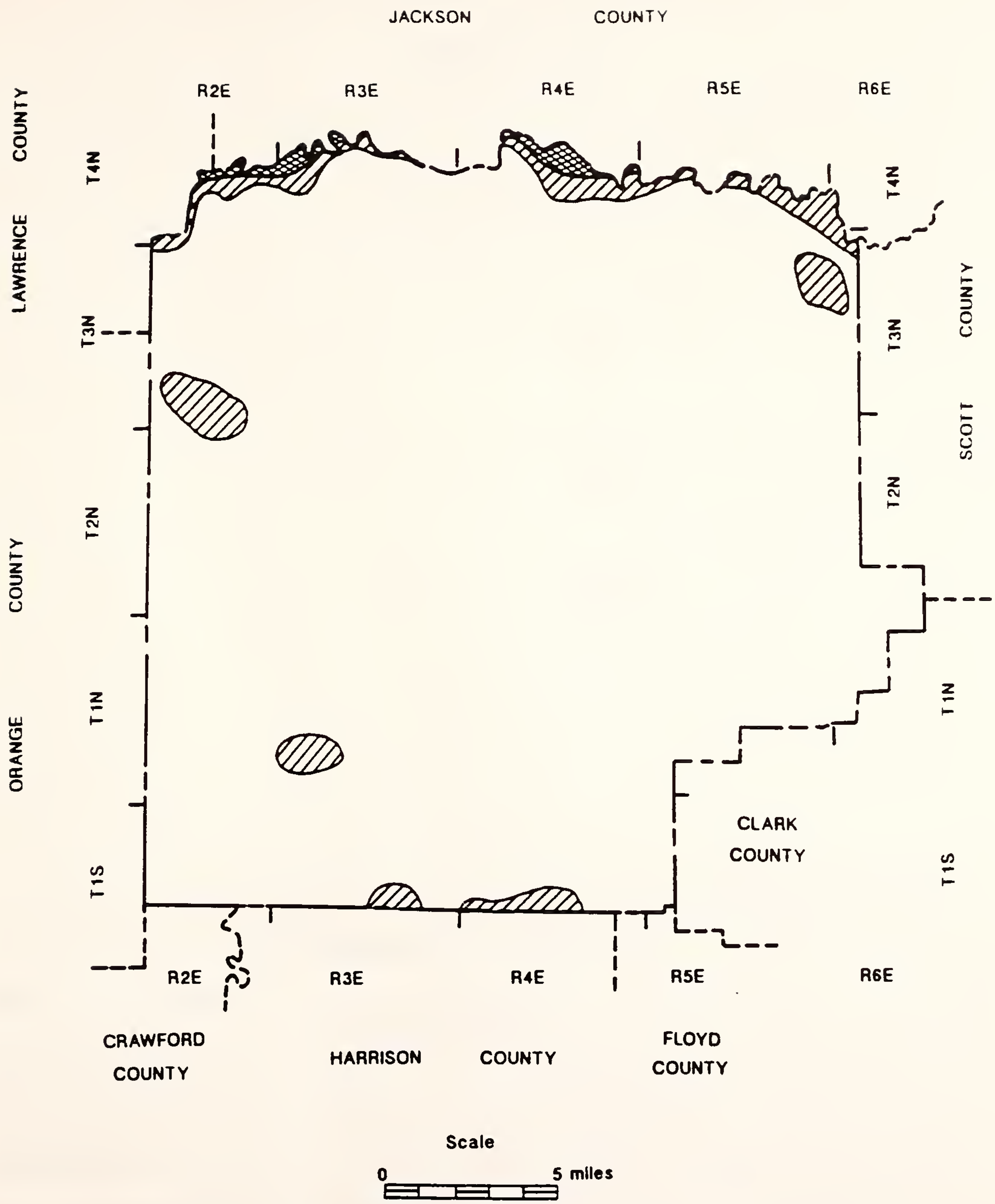

FIGURE 13. THICKNESS OF UNCONSOLIDATED DEPOSITS OF WASHINGTON COUNTY (26)

EXPLANATOIN

Range in Feet

Contour interval = 50 Feet

0 - 50

50 - 100

100 - 150

FIGURE 13. THICKNESS OF UNCONSOLIDATED DEPOSITS OF WASHINGTON COUNTY (26)

(CONTINUED)

LANDFORM-PARENT MATERIAL REGIONS

The soils in Washington County consist of Quaternary unconsolidated sediments and residual soils derived from limestone, siltstone, sandstone and shale bedrock. For mapping and discussion purpose, these materials have been classified into five groups according to parent material and landform in the following section. They are residual soils, glacial drift, fluvial drift, lacustrine drift and eolian drift. Then they are further subdivided into smaller groups for more specific description.

Each landform-parent material region is characterized by its overall extent, surface morphology and character, and general soil profile. Classification based on both the United States Department of Agriculture (USDA) textural designation and the American Association of State Highway and Transportation Officials (AASHTO) System is included. In addition, the agricultural soil series that form in each of the landform units are also indicated. Boring numbers, which correlate with the classification test results tabulated in Appendix A, are shown on the Engineering Soil Map for each soil unit. The physical and chemical, and engineering index properties of these soils are presented in Appendices B and C.

On the accompanying Engineering Soil Map, the landform-parent material regions of Washington County and the representative soil profiles of each of the regions are presented. Plus signs (+) are used to represent loess cover. In order not to make the map too complicated, a plus sign (+) is given only at the center of each section if a greater part of that section is covered by loess. Similarly, letter s is used to represent considerable number of sinkholes, and letter k is for well-developed karst topography. The engineering properties of different regions are briefly addressed in the following text. The discussion provides the investigator with a general idea of the engineering problem and engineering consideration associated with each landform-parent material region. For more specific information, the

reader is referred to the soil boring data in Appendix A, and the soil investigation reports in the reference list. Nevertheless, local variation is possible within any given region, and the information contained in this report should be used for preliminary design only.

RESIDUAL SOILS

The residual soils in Washington County are developed from the decomposition of rocks such as sandstone, shale, siltstone and limestone. They constitute the surface soils or near-surface soils for most parts of the county except the stream valleys. The thickness of these residual soils is highly variable, especially in the limestone region.

Sandstone, Shale and Siltstone Residuum

Residual soils of sandstone, shale and siltstone are found in the northern and eastern parts (Norman Upland) of the county. Small areas of residuum of sandstone, shale and siltstone are also found in the southwest corner (Crawford Upland), which is very likely derived from rocks of the West Baden Group. Parts of these residual soils are covered by thin blanket of loess.

This map unit makes up about 24 percent of the county. Erosion caused by overgrazing is the major hazard in this area. The soils in this area are generally unsuited to sanitary facilities and dwellings. Typically, the surface layer is silt loam or loam. The subsoils consist of silt loam, silty clay loam, clay loam, and loam (1). From boring data, the surface and subsurface soils developed along these residual soils can be classified as A-4(8) and A-4(6).

The agricultural soils that form on the sandstone, shale and siltstone residuum are Wellston, Zanesville, Berks-Weikert Complex, Elkinsville, Gilpin, Gilpin-Berks, Gilpin-Berks-Ebal Complex, and Peoga series. The liquid limits lie in the range of 20 and 75,

and plasticity indices ranges from NP to 20 (none to medium degree of plasticity) according to Appendix C.

Boring number 48, 49, and 52 are located in this region.

Limestone Residuum

The limestone residuum occupies the largest portion of Washington County, and is blanketed by a thin loess cover. Limestone residuum is the dominant soil in Mitchell Plain, and is also found on the Crawford Upland and the Norman Upland (6).

In the Mitchell Plain, which is unglaciated, the dominant landforms are rounded knolls with intervening lowlands, sinkholes, and associated depressions. Small areas are dissected by small drainageways. The surface drainage is through sinkholes and associated subterranean channels which are the indications of underlying limestone. As mentioned earlier, the St. Louis Limestone in this area is most susceptible to solution by ground water and thus may have most of the sinkhole developments.

A unique topography called karst can be seen in this area, especially on exposed limestone. The term karst is applied to special topography that is formed on limestone, gypsum, and other rocks by dissolution (8). It is characterized by numerous depressions, a notable lack of surface drainage, and many caves and subsurface openings (6). These underground cavities and induced sinkholes are the major problems in karst terrains.

Sinkhole formation is intensive in the southern and southwestern part of the county, especially in the area surrounded by the towns of Hardinsburg, Livonia, Becks Mills, Fredericksburg. Figure 14 illustrates the process of sinkhole development. A sinkhole density map for Washington County is prepared from the drainage map simply by counting the number of sinkholes in each section, and this is shown in Figure 15. Since most water is drained through

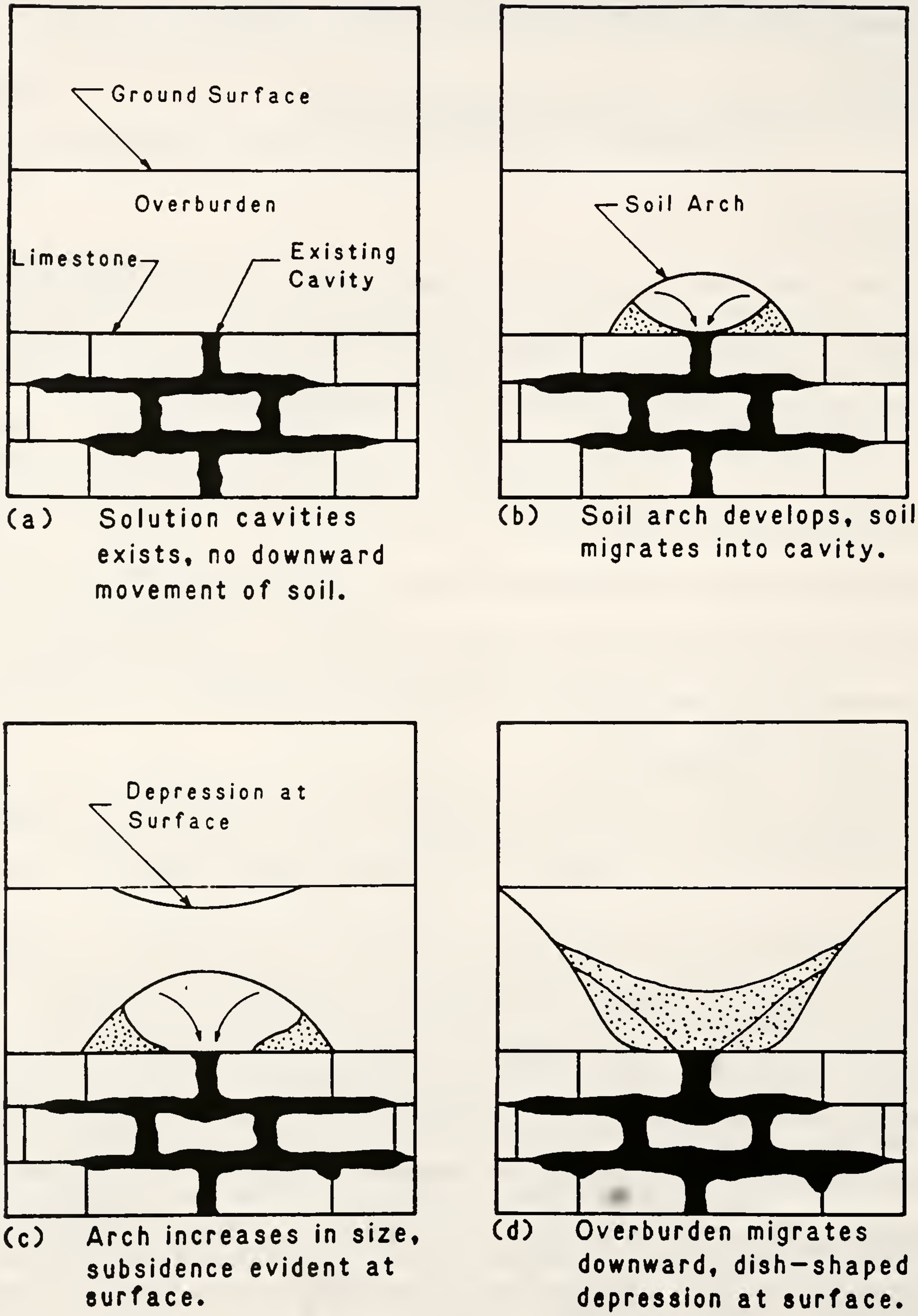

FIGURE 14. PROCESS OF SINKHOLE DEVELOPMENT (6)

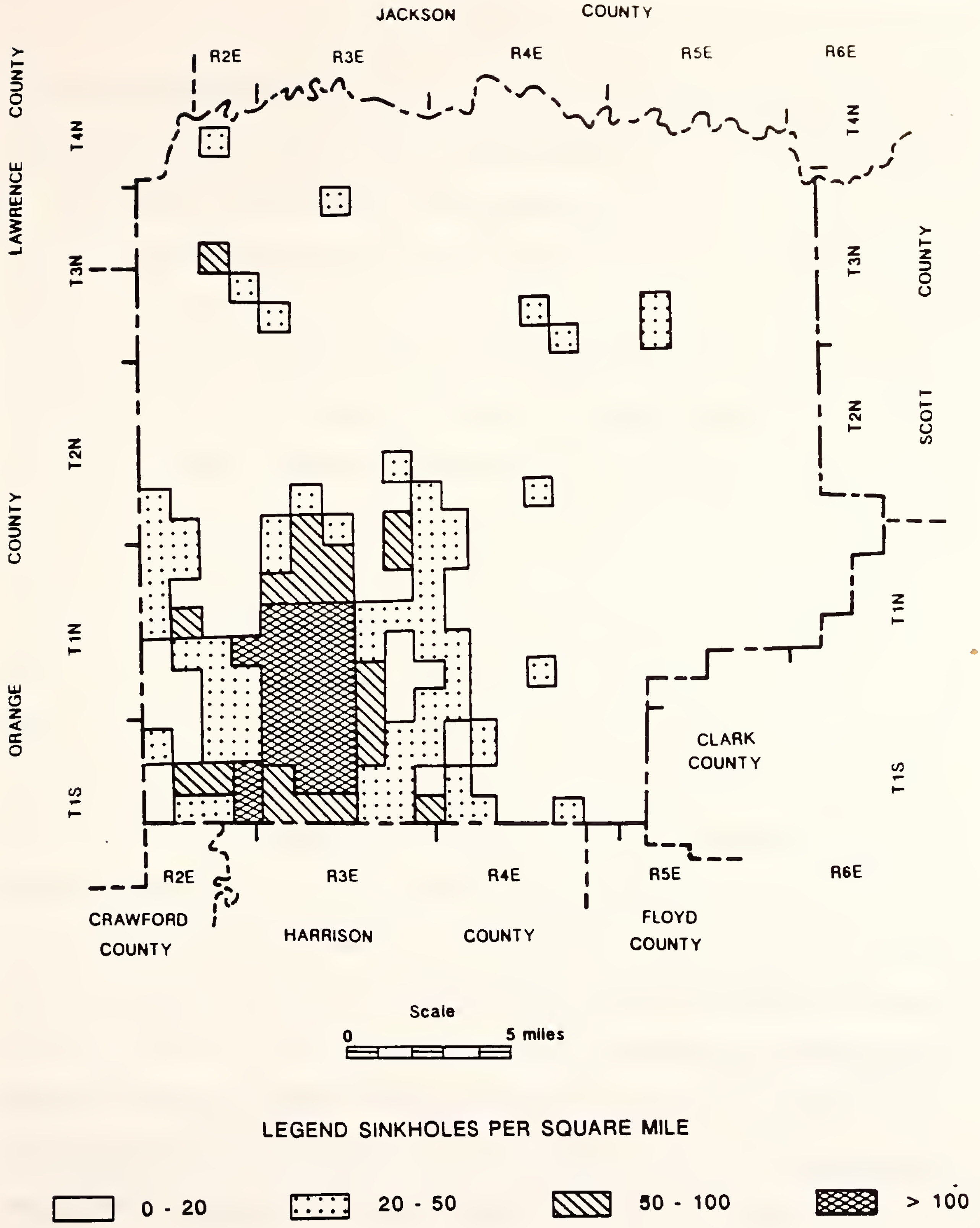

FIGURE 15. SINKHOLE DENSITY MAP OF WASHINGTON COUNTY (14)

sinkholes and underground channels, surface streams are not well developed. The Blue River and Lost River have cut into the Mitchell Plain (limestone residuum) deeply and form deep, narrow valleys. Thick residuum is common on the drainage divide between sinkholes and between valleys (9). On sideslopes, soils are usually thinner at the upper part than at the lower part.

This map unit makes up about 60 percent of the county. Erosion is the major concern in this area. Overgrazing is the major problem in controlling the erosion because the plant density is reduced. About 73 % of this area is fairly well-suited to sanitary facilities, dwellings, and recreational uses. Very minor extent of rock outcrops can be found on side slopes. Typically, the surface layer is silt loam. The subsoil is silt loam and silty clay loam in the upper part; silty clay loam, silt loam or silty clay in the next part; and silty clay or clay in the lower part (1). The wide variation of soil profile in this landform is shown on the attached map. From the boring data available in this area, the RQD values of the bedrock range from 20 to 95. The liquid limits range from 21 to 92, whereas plasticity indices fall between NP and 65. The surface and subsurface soils developed along these residual soils consist of clay, silty clay, silty loam, silty clay loam, clay loam, loam, and sandy loam. They can also be classified as A-6(0-16, 18, 19), A-7-6(12, 14-20, 33), A-4(0-8), A-2-6, A-2-4, and A-7-5(45). Fragments of limestone and chert are often encountered in these soils. The underlying bedrock is interbedded limestone and shale.

The agricultural soils that form on limestone residuum are Bedford, Bromer, Caneyville-Hagerstown, Caneyville-Rock Outcrop Complex, Crider, Crider-Frederick, Frederick, Frederick-Baxter Variant Complex, Hagerstown, and Hagerstown-Caneyville series.

Boring numbers 1-16, 20-47, 58-225 are located in this region. According to the boring logs, the soil profile in limestone residuum is very irregular and erratic. This is probably due to the fact of irregular weathering and the formation of karst topography.

Engineering Considerations in Residual Soils

The residual soils, either derived from limestone or sandstone-shale, are susceptible to weathering. In southern Indiana, the residual soils developed from limestone and shale are relatively deep, and it is seldom that the unweathered rock formations are within 10 feet of the ground surface. However, chert fragments are present in these residual soils at almost every location and depths.

In the sandstone-shale area, care should be taken on fill material of embankment in highway construction. Shale fragments are unsuited because of their low slaking durability and difficulty in compaction. A mixture of sandstone and shale fragments is also unfavorable.

In limestone residuum area, karst topography and sinkholes are the major concerns. Actually they are the major geologic hazards. The avoidance of karst areas is highly desired because the construction and maintenance of highway in karst area is a challenge. The unpaved ditchlines are very prone to sinkhole formation and collapse. To solve this problem, engineers usually treat the ditchlines with an impervious material such as concrete to prevent sinkholes development and enlargement, and backfill induced sinkholes with chunk rock (8). Although this repair of sinkholes is always necessary to prevent further collapse, the fill of sinkholes may alter the subsurface and surface drainage features. Thus, special filling material and construction technique are needed.

In addition, sinkholes and cavities are also dangerous to shallow foundations. Deep foundations founded on solid rock are recommended for moderate to large structures. It is

also recommended that extensive subsurface exploration is necessary before design, especially in mantled-karst areas where the overlying deposits obscure the potential of subsurface erosion and sinkhole development. The exploration program may consist of the use of standard penetration test borings, electric piezocone soundings, ground penetrating radar, and piezometers to document the subsurface condition (8). A variety of geophysical methods are also available to detect the location of cavities such as electrical resistivity, surface seismic, crosshole seismic, acoustic resonance, electromagnetic and microgravity methods (8). In planning cut and fill for highways, it is also necessary to pay attention to the rugged surface and variable depths to bedrock.

In karst areas, seepage is also likely to occur which drains lakes and ponds. Another greater danger comes from the leakage of sewage effluent storage pond which can cause the contamination of groundwater. Under such circumstances, a grouting program might be necessary.

GLACIAL DRIFT

The bedrock in northern, northeastern and eastern parts of the county is covered by till, sand and gravel deposited by Illinoian glaciers. Parts of these glacial drift materials were later covered by outwash of Wisconsin and alluvium of Recent age; the others are still exposed at the ground surface. As it can be seen in the accompanying map, most of the glacial drifts are located in the northeast corner of the county. The largest glacial till covered area is located south of the town of Little York. In Washington County, the entire glacial drift is covered by loess.

The map unit of glacial drift makes up one to two percent of the county. Erosion can occur if the plant density is reduced. The soils in this area are poorly suited to sanitary facilities

and dwellings. Typically, the surface layer is silt loam, and the subsoil consists of silt loam, loam and clay loam (1). From the boring data in Appendix A, the liquid limits of these soils range from 27 to 43, and plasticity indices from 2 to 24. The surface and subsurface soils developed along these glacial drifts consist of clay, silty clay loam, silt loam, and loam. They can also be classified as A-4(0,8), A-7-6(14), and A-6(10).

The agricultural soils that form on glacial drift are Avonburg, Cincinnati, Hickory, and Rossmoyne series.

Boring numbers 51, 55, 56, 57 are located in this region.

Engineering Considerations in Glacial Drift

In Washington County, most of the glacial drifts are of Illinoian Age. The soils have been weathered to a considerable depth so that the surface soils are predominantly silts (3). Thus, they are too weak for highway subgrade. Either replacement or improvement of the soils is necessary. The possibility of frost-heaving damage to highway pavement is quite low in spite of the presence of silts. This is probably due to warmer climate and uniform heaving (3). In addition, great difficulty may be expected in construction during wet season in Illinoian drift area, where silts are prevalent. These silts are unstable at a moisture content even one percent above their critical optimum moisture content. If sheepsfoot or tamping rollers are used to recompact such soils, great care should be taken in constructing the fill with a considerable crown (3).

The silts in Illinoian drift area are also susceptible to erosion, particularly the loess cover. The glacial drift generally has poor gradation, and sometimes the buried channel under surface deposits can cause serious engineering problems during highway construction.

FLUVIAL DRIFT

Fluvial drift appears in two landforms in Washington County. They are flood plain and terrace.

Flood Plain

Soils of flood plain generally are adjacent to the streams and in the lower areas away from the streams. There are flood plains developed along the four river systems. In general, the flood plains of the White River system are larger than those of the other three river systems. The Middle Fork and South Fork of Blue River also have flood plains of considerable extent. However, the main channel of the Blue River cuts into the surrounding bedrock as deep as 100 feet. Thus, only limited areas of flood plains have developed along the Blue River channel. Besides, there is no loess cover on flood plain.

The largest flood plain appears in the northeast corner of the county. It is associated with the Muscatatuck River, one of the branches of the White River system. In the southwest corner of the county, there are hanging flood plains developed due to the presence of sinkholes and underground drainage.

In particular, the soil profile of flood plain along the East Fork of White River has courser grains in the lower part because the velocity of meltwater of Illinoian glacier is much higher than the present stream (6).

This map unit makes up about 10 percent of the county. Wetness and flooding are the major concerns in this area. The soils are generally unsuited to sanitary facilities and dwellings. Typically, the surface layer and the subsoils are silt loams (1).

From the boring data, the surface and subsurface soils developed along these flood plains consist of clay loam, silty clay loam, silty clay (with gravel), clay, limestone (with shale), sandy loam (with gravel), silty loam, loam, and sand. Or they can be classified as A-2-6(0), A-2-4(0),

A-4(1, 4, 6, 8), A-6(5, 6, 8), A-7-6(6, 12, 13, 14, 15, 16, 17, 19, 25). The liquid limits fall between 24 and 55, and the plasticity indices range from NP to 25. The underlying bedrock is limestone or shale.

The agricultural soils that form in these areas are the Bonnie, Burnside, Cuba, Haymond, Nolin, Stendal, and Wakeland series.

Boring numbers 17-19, 50, 53, 54, 226-263 are located on flood plains.

Terrace

This map unit consists of soils on terraces and the higher rises away from the stream. There are several reasons for the formation of terraces in Washington County. Some of them are alluvial terraces, others are lacustrine terraces which are formed in choked (by valley-train) and ponded stream valleys during Wisconsin age. Similarly, there are some terraces associated with outwash of Wisconsin age. These terraces of different origin are grouped together because they are closely related and sometimes adjacent to one another.

Terraces are distributed along the stream valleys of the four major river systems. Some of the terraces are covered by eolian materials, or sand dunes (but not loess). The largest terrace is located on the northern border where the Muscatatuck River enters the East Fork of White River. Its formation is related to water action of the Muscatatuck River. There are also lacustrine deposits because this area was ponded during Wisconsin age.

Terraces make up about 4 percent of the county. Wetness and erosion are the major concerns. The soils are unsuited to sanitary facilities and dwellings. Typically, the surface layer is silt loam or silty clay. The underlying materials are silt loam, silty clay loam, or silty clay (1).

The agricultural soils that form in these areas are the Alvin, Markland, Chetwynd, McGary, Montgomery, Pekin, Bartle, and Zipp series. According to Appendix C, the liquid limits are smaller than 65, and the plasticity indices range from NP to 42.

No soils boring reports are available for terrace areas at the time of preparing this report.

Engineering Considerations in Fluvial Drift

Fluvial sediments are usually layered. Therefore, the permeability in the horizontal direction is much greater than the vertical direction. The composition is highly variable, but the soil typically is normally consolidated (10).

The engineering problems associated with flood plain are their low shear strengths, high compressibility, and the danger of scour (6). As mention earlier, wetness and flooding are the major concerns. It is also difficult to construct buildings or bridges because of the underlying soft material.

For terrace, high potential of erosion is the major engineering problem, especially on the side slopes. Moreover, terraces are very prone to circular type of failure. Usually these failures occur after heavy rainfall.

Excavation is a problem in fluvial drift for both flood plains and terraces. This is mostly due to high groundwater table. A dewatering program should be included in construction.

LACUSTRINE DRIFT

Lacustrine drift occurs in the form of lacustrine plain in Washington County. Besides, there are also lacustrine deposits found in terrace areas as discussed earlier, and will not be repeated here.

Lacustrine Plain

Lacustrine plains are present in the northeast corner of the county. Most of them are very small in areal extent, and they are all related to the tributaries of the Muscatatuck River. All the lacustrine plains have a thin loess cover. The major lacustrine plain occurs around the town of Little York.

Lacustrine plain makes up 1 or 2 percent of the county. Erosion and wetness are common concerns in this area. The soils are poorly suited to sanitary facilities and dwellings. Typically, the surface layer is silt loam, whereas the subsoils are silt loam, silty clay loam, and silt loam (1).

The agricultural soils that form in these areas are the Dubois, Haubstadt, and Otwell series. Their liquid limits are smaller than 50, and they have plasticity indices ranging from 3 to 30 (1).

No soils boring reports are located on lacustrine plains at the time of preparing this report.

Engineering Considerations in Lacustrine Plain

The soils of lacustrine plain are moist in nature. They have low shear strength and high compressibility. Therefore, they are prone to large settlement if loaded. The sediments of lacustrine origin in Washington County have a silt texture in contrast to the clay-like texture in the northern part of the state. Pavement design problems are also less than the northern counties (3).

EOLIAN DRIFT

The eolian deposits actually almost cover the entire surface of the Washington County. They are in the form of loess veneer and sand dunes. Since loess cover is relatively thin, it is classified according to underlying materials and discussed in the previous section. Besides, it

is not shown as an independent map unit on the Engineering Soil Map, but is identified by a textural symbol (+). In the following section only sand dunes will be discussed.

Windblown Sand Deposit

Sand dunes are found on the area adjacent to the East Fork of White River. Some of them occur on terraces, which has been discussed earlier. Others are deep windblown sand deposits. Both of them are probably migrating sand dunes in Wisconsin age.

The agricultural soil that forms on windblown sand deposits is Bloomfield series. The liquid limits are smaller than 20, and the plasticity indices lie in the range of NP and 3 (none to slight degree of plasticity).

No soils boring reports are available for windblown sand deposits at the time of preparing this report.

Engineering Considerations in Windblown Sand Deposit

Windblown sand deposits are always in a loose state because of their uniform gradation and low speed of deposition (10). However, the soil profile of windblown sand deposit in Washington County may be erratic and vary from place to place since no boring log is available.

Engineering Considerations in Mantled-loess Area

Loess has sufficient strength while it is dry. The highway cut slope in loess can stand vertically if no water is added. Localized failure is possible on loess slope due-to freeze, thaw and desiccation. Loess usually is loose-textured and has high porosity. For the loess soils from midcontinental U.S., the pore space is generally composed of continuously connected pores with a model pore size of about 5 to 10 (11). Moreover, almost all the pores are ink bottle

pores, i.e., the pore throat to pore body ratio is relatively small. In Indiana, loess may be fairly thick in some localities. However, most of the loess veneer has only 5 to 10 feet in thickness (3).

MISCELLANEOUS

Pits and Quarries

A number of quarries from which limestone has been removed are seen around the town of Salem in the central part of the county. There is also an abandoned sandpit in the southeast corner of the county.

Marsh and Swamps

A few marshes are seen around the county and are shown on the Engineering Soil Map. The marsh and swamp soils are characterized by their low strength and high compressibility. Furthermore, they become weaker with time and are generally corrosive (highly acidic) to foundation material (10).

SUMMARY OF ENGINEERING CONSIDERATIONS IN WASHINGTON COUNTY

Table 5 is the summary of engineering considerations for different landform-parent material regions in Washington County. Each landform-parent material and their associated engineering problems are included in the table. However, the ranking shown in the table is recommended to be used as a general guideline only. Site specific investigation is always needed for any project in Washington County.

Table 5. Summary of Engineering Considerations for Landform-Parent Material Regions in Washington County.

EXPLANATION

PROBABILITY OF A MAJOR PROBLEM DEVELOPING
L (LOW)
M (MEDIUM)
H (HIGH)

AVAILABILITY RATING
1 (LOW)
2 (MEDIUM)
3 (HIGH)

LANDFORM	GENERAL SOIL TEXTURE	CUT DESIGN					EMBANKMENT FILLS					EMBANKMENT FOUNDATION				SUBGRADE				FOUNDATION DESIGN								MISCELLANEOUS				
							COMPACTED PROPERTIES													SHALLOW FOOTINGS			PILES									
		SOIL/ROCK BACKSLOPE INSTABILITY	GROUND WATER CONTROL	EROSION POTENTIAL	SURFACE DRAINAGE	NATURAL SLOPE AND RIVER BANK INSTABILITY	EROSION RESISTANCE	RELATIVE PERMEABILITY	INADEQUATE SHEAR STRENGTH	COMPRESSIBILITY WHEN SATURATED	WORKABILITY PROBLEMS	INADEQUATE SHEAR STRENGTH	EXCESSIVE SETTLEMENTS	ORGANIC DEPOSIT OCCURENCE	GROUNDWATER CONTROL	SUBGRADE SUPPORT INADEQUATE	FROST ACTION POTENTIAL	PUMPING POTENTIAL	SHRINK-SWELL POTENTIAL	INADEQUATE BEARING CAPACITY	EXCESSIVE SETTLEMENT POTENTIAL	SCOUR POTENTIAL	INADEQUATE BEARING CAPACITY	EXCESSIVE SETTLEMENT POTENTIAL	NEGATIVE SKIN FRICTION	SCOUR POTENTIAL	ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES	AVAILABILITY OF AGGREGATE	STEEL CORROSIVITY	CONCRETE CORROSIVITY	BEHAVIOR OF SEPTIC TANK FIELDS	GROUNDWATER RESOURCE POTENTIAL
Sandstone, Shale and Siltstone Residuum	Silt, Clay, Sand	M/H	M	H	L/M	M/H	L	1-2	M/H	H	H	M/H	M	L	L/M	M	M/H	M/H	L/M	M/H	M	M/H	L	L	M	M/H	NA	1	L/M	L/M	M/H	1
Limestone Residuum	Silt, Clay, Sand, Rock fragments	M/H	H	H	H	M/H	L	2-3	M/H	M/H	M	M/H	M/H	L	M/H	M/H	M/H	M/H	M	M/H	M/H	M/H	L	L	M/H	M/H	NA	1	M/H	L/M	M	1
Glacial Drift	Silt, Clay, Sand	M	L/M	M	L	M/H	M	1-2	M/H	M/M	H	H	M	L/M	L/M	H	L/M	HA	L	H	M/H	M	L	L	NA	M	NA	1	HA	NA	M/H	1
Flood Plain	Silt, Sand, Clay	M/M	M/H	H	L	M/H	L/M	3	L/H	H	L/M	L/H	H	M	M/H	L/H	M/H	M	L	H	H	M/H	L	L	L/H	M/H	NA	1	L/M	M	M/H	1-2
Terrace	Silt, Clay, Sand	H	M/H	H	L	H	L	2	M/H	M	L/M	M	M	M	M/H	M	M/H	L/M	M/H	M	M	M/H	L	L	L/M	M/H	NA	1-2	L/M	M	M/H	1
Lacustrine Plain	Silt, Clay, Sand	M/H	L/M	M/H	L	M/H	L/M	2	M/H	H	L/M	M/H	H	M	L/M	M/H	M/H	HA	M	H	H	M	L	L	NA	M	NA	1	NA	NA	M/H	1
Windblown Sand Deposit	Sand	M/H	M/H	M/H	L	M/H	L	3	L/M	L/M	L/M	L/M	L/M	L	M/H	L/M	L	NA	L	L/M	L/M	M/H	L	L	NA	L/M	NA	1-3	NA	NA	M/H	1

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APPENDIX A

CLASSIFICATION TEST RESULTS FOR SELECTED ENGINEERING PROJECTS IN ADAMS COUNTY (27-38)

Appendix A1 - Borehole data for SR 135 at SR 56 and SR 60 (at Salem)

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
						Texture	AASHTO			Gravel	Sand	Silt	Clay			
1	SS-1	50+45	35LT	762.2	1.0 - 2.5	fill	- -	12	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	3.5 - 5.0	silty clay	A-6(18)	9	- -	2	11	54	34	39	18	21
	SS-3	"	"	"	6.0 - 7.5	"	"	10	- -	- -	- -	- -	- -	- -	- -	- -
2	BS-1	50+45	33RT	760.0	1.0 - 3.0	clay	A-7-6(27)	- -	- -	3	8	46	44	49	21	28

Appendix A2 - Borehole data for SR 66 over Honey Creek

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
3	SS-1	90 + 89	12RT	641.0	0.0-1.5	Silty Loam	A-6(18)	7	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	2.5-4.0	"	"	7	- -	0	3	79	18	34	15	19
	SS-3	"	"	"	5.0-6.5	"	"	7	- -	- -	- -	- -	- -	- -	- -	- -
	SS-4	"	"	"	7.5-9.0	"	"	13	- -	- -	- -	- -	- -	- -	- -	- -
	SS-5	"	"	"	10.0-11.5	"	"	14	- -	- -	- -	- -	- -	- -	- -	- -
	SS-6	"	"	"	12.5-14.0	Silty Clay & limestone frag.	A-7-6	65	- -	- -	- -	- -	- -	- -	- -	- -
	NXM-1	"	"	"	14.0-19.0	limestone w/shale	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	NXM-2	"	"	"	20.0-25.0	limestone	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
4	SS-1	91+25	5LT	641.4	0.5-1.5	fill	A-6	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SS-1A	"	"	"	1.5-2.0	Silty clay loam	A-6	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	2.5-4.0	"	"	13	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	5.0-6.5	Silty loam	A-6(12)	11		0	5	77	18	32	20	12
	SS-4	"	"	"	7.5-9.0	"	"	15	- -	- -	- -	- -	- -	- -	- -	- -
	SS-5	"	"	"	10.0-11.5	"	"	20	- -	- -	- -	- -	- -	- -	- -	- -
	SS-6	"	"	"	12.5-13.0	Siltyclay w/limestone frag.	A-7-6	>100	- -	- -	- -	- -	- -	- -	- -	- -
	NXM-1	"	"	"	14.0-19.0	Limestone w/shale	- -	- -	58	- -	- -	- -	- -	- -	- -	- -
5	SS-1	91+55	12RT	641.3	0.0-1.5	Silty Loam	A-6	8	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	2.5-4.0	Silty clay loam	A-6	9	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	5.0-6.5	"	"	9	- -	- -	- -	- -	- -	- -	- -	- -
	SS-4	"	"	"	7.5-9.0	"	"	9	- -	- -	- -	- -	- -	- -	- -	- -
	SS-5	"	"	"	10.0-11.5	"	"	18	- -	- -	- -	- -	- -	- -	- -	- -
	SS-6	"	"	"	12.5-14.0	Silty clay	A-7-6(33)	8	- -	0	15	54	31	58	22	36
	SS-7	"	"	"	15.0-16.5	Limestone fragment	- -	>100	- -	- -	- -	- -	- -	- -	- -	- -
	NXM-1	"	"	"	17.5-22.5	Limestone	- -	- -	60	- -	- -	- -	- -	- -	- -	- -
	NXM-2	"	"	"	22.5-27.5	Limestone w/shale	- -	- -	80	- -	- -	- -	- -	- -	- -	- -
6	SS-1	92+01	5LT	641.9	0.5-2.0	Fill	- -	15	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	2.5-4.0	Silty Clay Loam	A-6	8	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	5.0-6.5	Silty Clay Loam	A-6	10	- -	- -	- -	- -	- -	- -	- -	- -
	SS-4	"	"	"	7.5-9.0	"	"	14	- -	- -	- -	- -	- -	- -	- -	- -

Appendix A2 - Borehole Data for SR 66 over Honey Creek

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
6	SS-5	92+01	5LT	641.9	10.0-11.0	Silty Clay Loam	A-6	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SS-5A	"	"	"	11.0-11.5	Silty Clay	A-7-6	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SS-6	"	"	"	12.5-14.0	"	"	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SS-7	"	"	"	15.0-16.0	"	"	>100	- -	- -	- -	- -	- -	- -	- -	- -
	NXM-1	"	"	"	17.0-22.0	Limestone w/shale	- -	- -	72	- -	- -	- -	- -	- -	- -	- -
	NXM-2	"	"	"	22.0-27.0	"	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
7	SS-1	92+31	9RT	642.3	0.5-2.0	Fill	- -	26	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	5.0-6.5	Silty Loam	A-6	10	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	7.5-9.0	Silty Clay Loam	A-6	12	- -	- -	- -	- -	- -	- -	- -	- -
	SS-4	"	"	"	10.0-11.5	Silty Clay Loam	A-6	9	- -	- -	- -	- -	- -	- -	- -	- -
	SS-5	"	"	"	12.5-14.0	Silty Clay w/limestone	A-7-6	28	- -	- -	- -	- -	- -	- -	- -	- -
	NXM-1	"	"	"	18.0-23.0	Limestone	- -	- -	70	- -	- -	- -	- -	- -	- -	- -
	NXM-2	"	"	"	24.5-28.0	Limestone w/shale	- -	- -	50	- -	- -	- -	- -	- -	- -	- -
8	SS-1	92+67	5LT	642.2	0.5-2.0	Fill	A-6	18	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	2.5-4.0	Silty Loam	A-6	7	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	5.0-6.5	Silty Clay Loam	A-6	9	- -	- -	- -	- -	- -	- -	- -	- -
	SS-4	"	"	"	7.5-9.0	Silty Loam	A-6	10	- -	- -	- -	- -	- -	- -	- -	- -
	SS-5	"	"	"	10.0-11.5	"	A-6	15	- -	- -	- -	- -	- -	- -	- -	- -
	SS-6	"	"	"	12.5-14.0	Silty Loam w/limestone frag.	A-6	28	- -	- -	- -	- -	- -	- -	- -	- -
	SS-7	"	"	"	15.0-16.5	Silty Clay	A-7-6	11	- -	- -	- -	- -	- -	- -	- -	- -
	NXM-1	"	"	"	17.5-22.5	Limestone w/shale	- -	- -	60	- -	- -	- -	- -	- -	- -	- -
9	SS-1	81+00	38LT	651.4	0.0-0.5	Silty Clay Loam	A-6(10)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SS-1A	"	"	"	0.5-1.5	"	"	- -	- -	0	10	68	22	32	21	11
	SS-2	"	"	"	2.5-4.0	"	"	15	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	5.0-6.5	Silty Clay w/limestone Frag.	- -	18	- -	- -	- -	- -	- -	- -	- -	- -
	SS-4	"	"	"	7.5-8.5	"	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Appendix A2 - Borehole Data for SR 66 over Honey Creek

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
10	SS-1	84+10	20LT	642.0	0.0-1.5	Silty Clay Loam	A-6(19)	6	- -	6	6	59	29	40	19	21
	SS-2	"	"	"	5.0-6.5	"	"	8	- -	- -	- -	- -	- -	- -	- -	- -
	NXM-1	"	"	"	7.5-12.5	Limestone	- -	- -	33	- -	- -	- -	- -	- -	- -	- -
	NXM-2	"	"	"	12.5-17.5	"	- -	- -	85	- -	- -	- -	- -	- -	- -	- -
	NXM-3	"	"	"	17.5-22.5	"	- -	- -	41	- -	- -	- -	- -	- -	- -	- -
	NXM-4	"	"	"	22.5-27.5	"	- -	- -	95	- -	- -	- -	- -	- -	- -	- -
11	SS-1	85+01	21LT	637.4	0.0-1.5	Fill	A-6	20	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	5.0-6.5	Silty Clay Loam w/ limestone frag.	A-6	30	- -	- -	- -	- -	- -	- -	- -	- -
	NXM-1	"	"	"	7.5-12.5	Limestone	- -	- -	60	- -	- -	- -	- -	- -	- -	- -
	NXM-2	"	"	"	12.5-17.5	LImestone	- -	- -	55	- -	- -	- -	- -	- -	- -	- -
12	SS-1	89+09	60RT	640.2	0.0-1.5	Silty Loam	A-6	9	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	2.5-4.0	Silty Clay Loam	A-6(19)	8	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	5.0-6.5	"	"	9	- -	- -	- -	- -	- -	- -	- -	- -
	SS-4	"	"	"	7.5-9.0	"	"	11	- -	- -	- -	- -	- -	- -	- -	- -
	BS-1	"	"	"	2.5-7.5	"	"	- -	- -	0	2	72	26	38	20	18
13	SS-1	97+00	12RT	657.0	0.0-1.5	Silty Loam w/limestone	A-6	7	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	2.5-4.0	Fragment "	"	10	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	5.5-7.0	"	"	14	- -	- -	- -	- -	- -	- -	- -	- -
14	SS-1	98+88	9RT	656.6	0.5-2.0	Fill	- -	8	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	2.5-4.0	Silty loam w/ limestone frag.	A-6	68	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	5.0-5.5	Silty Clay	- -	>100	- -	- -	- -	- -	- -	- -	- -	- -
	NXM-1	"	"	"	7.0-9.0	Limestone	- -	- -	20	- -	- -	- -	- -	- -	- -	- -
	NXM-2	"	"	"	9.0-13.0	"	- -	- -	60	- -	- -	- -	- -	- -	- -	- -
	NXM-3	"	"	"	13.0-18.0	Limestone w/ shale	- -	- -	67	- -	- -	- -	- -	- -	- -	- -
	NXM-4	"	"	"	18.0-23.0	"	- -	- -	67	- -	- -	- -	- -	- -	- -	- -

Appendix A3 - Borehole Data for SR 56 from 2 Mile East of SR 135 in Salem East to 6.8 Mile East of Salem

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
15	- -	271+00	32RT	753.0	0.0-1.0	Silty Clay Loam	A-4(8)	- -	- -	1	9	64	17	32	25	7
	- -	"	"	"	1.0-4.0	Silty Clay or Silty Clay Loam	A-6(8)	- -	- -	1	10	59	16	33	22	11
	- -	"	"	"	4.0-5.2	Clay loam	A-6(5)	- -	- -	13	31	36	11	31	20	11
16	- -	286+00	5LT	759.0	0.0-1.1	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.1-5.4	- - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	5.4-6.0	- - - - - - - - - -	A-6(5)	- -	- -	- -	- -	- -	- -	- -	- -	- -
17	- -	295+00	CL	762.8	0.0-0.8	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.8-3.0	Clay Loam	A-6(8)	- -	- -	4	23	48	15	33	22	11
	- -	"	"	"	3.0-3.8	- - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
18	- -	302+00	CL	764.1	0.0-1.0	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.0-3.8	- - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
19	- -	309+00	CL	770.9	0.0-1.0	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.0-2.6	- - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	2.6-3.4	- - - - - - - - - -	A-6(5)	- -	- -	- -	- -	- -	- -	- -	- -	- -
20	- -	321+00	CL	840.8	0.0-1.2	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.2-3.8	Silty Clay	A-6(11)	- -	- -	8	7	50	17	39	20	19
21	- -	330+00	CL	850.8	0.0-1.2	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.2-4.2	- - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
22	- -	343+20	CL	822.5	0.0-1.0	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.0-2.8	- - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
23	- -	349+00	CL	787.5	0.0-1.0	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.0-4.2	- - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -

Appendix A3 - Borehole Data for SR 56 from2 Mile East of SR 135 in Salem East to 6.8 Mile East of Salem

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	Soil Description AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
24	- -	353+20	CL	817.6	0.0-0.8	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.8-2.8	- - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
25	- -	361+25	CL	841.8	0.0-0.6	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.6-2.4	- - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
26	- -	366+00	CL	854.9	0.0-0.6	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.6-1.5	- - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.5-4.0	Clay	A-6(11)	- -	- -	1	11	48	16	40	21	19
27	- -	368+33	CL	861.6	0.0-1.0	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.0-2.6	- - - - - - - - - -	A-6(10)	- -	- -	- -	- -	- -	- -	- -	- -	- -
28	- -	372+00	CL	860.3	0.0-0.6	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.6-2.0	- - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	2.0-3.0	- - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
29	- -	373+85	CL	846.5	0.0-1.8	- - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.8-3.2	- - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
30	- -	378+00	CL	860.3	0.0-0.6	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.6-2.2	- - - - - - - - - - -	A-6(8)	- -	- -	- -	- -	---	- -	- -	- -	- -
	- -	"	"	"	2.2-3.4	- - - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
31	- -	384+50	CL	851.5	0.0-0.7	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.7-2.4	- - - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	2.4-4.2	- - - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	---	- -	- -
32	- -	389+00	CL	855.9	0.0-0.7	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.7-2.4	- - - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	2.4-3.3	- - - - - - - - - - -	A-6(11)	- -	- -	- -	--	- -	- -	- -	- -	- -

Appendix A3 - Borehole Data for SR 56 from 2 Mile East of SR 135 in Salem East to 6.8 Mile East of Salem

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
33	- -	401+00	CL	866.3	0.0-0.8	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.8-3.0	- - - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
34	- -	416+20	CL	882.9	0.0-0.9	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.9-2.2	- - - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
35	- -	421+00	CL	894.4	0.0-0.9	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.9-3.0	- - - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	3.0-4.2	- - - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
36	- -	424+25	CL	886.2	0.0-0.8	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.8-2.4	- - - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	2.4-3.4	- - - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
37	- -	429+00	CL	868.6	0.0-1.3	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.3-2.8	- - - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
38	- -	432+50	CL	883.3	0.0-1.0	- - - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.0-3.4	- - - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
39	- -	439+00	CL	904.4	0.0-1.0	Silty clay	A-6(8)	- -	- -	1	9	57	20	34	23	11
	- -	"	"	"	1.0-4.4	Clay	A-6(11)	- -	- -	1	10	50	12	39	21	18
40	- -	449+50	CL	908.9	0.0-1.0	- - - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.0-4.3	- - - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
41	- -	455+00	CL	913.9	0.0-1.0	- - - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.0-3.2	- - - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
42	- -	461+10	CL	908.5	0.0-1.1	- - - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.1-2.2	- - - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	2.2-4.2	- - - - - - - - - - -	A-6(5)	- -	- -	- -	- -	- -	- -	- -	- -	- -

Appendix A3 - Borehole Data for SR 56 from 2 Mile East of SR 135 in Salem East to 6.8 Mile East of Salem

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
43	- -	467+00	CL	922.2	0.0-0.8	- - - - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.8-3.0	- - - - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
44	- -	473+00	CL	924.5	0.0-1.0	- - - - - - - - - - - -	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.0-3.0	- - - - - - - - - - - -	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -

Appendix A4 - Borehole Data for Relocated SR 56 from 5.17 Miles East SR 135 in Salem E. to the Washington-Scott County Line

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
45	- -	497+00	CL	924.7	0.0-0.8	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.8-3.0	- - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
46	- -	508+00	CL	925.7	0.0-0.8	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.8-3.0	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
47	- -	528+00	CL	937.9	0.0-0.7	Silty clay loam	A-4(8)	- -	- -	1	20	56	16	26	23	3
	- -	"	"	"	0.7-6.3	Silty clay	A-4(8)	- -	- -	0	15	51	14	27	18	9
48	- -	601+00	CL	659.6	0.0-1.2	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.2-4.2	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
49	- -	615+00	CL	660.3	0.0-1.4	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.4-2.8	- - - - - - - - - - -	A-4(6)	- -	- -	- -	- -	- -	- -	- -	- -	- -
50	- -	656+79	CL	610.3	0.0-1.2	- - - - - - - - - - -	A-4(8)	- -	- -	---	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.2-4.3	- - - - - - - - - - -	A-4(6)	- -	- -	- -	- -	- -	- -	- -	- -	- -
51	- -	666+00	CL	595.9	0.0-1.0	Silty loam	A-4(8)	- -	- -	3	17	62	10	28	26	2
	- -	"	"	"	1.0-4.2	Loam	A-4(6)	- -	- -	16	24	43	9	27	20	7
52	- -	695+00	CL	604.5	0.0-1.6	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	---
53	- -	700+00	CL	583.1	0.0-0.9	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.9-4.8	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
54	- -	715+00	CL	565.9	0.0-0.8	- - - - - - - - - - -	A-4(8)	---	- -	---	- -	- -	- -	- -	- -	- -
	- -	"	"	"	0.8-4.8	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
55	- -	730+00	CL	552.9	0.0-0.7	Silty clay loam	A-4(8)	- -	- -	0	11	66	14	30	23	7
	- -	"	"	"	0.7-6.0	"	A-4(8)	- -	- -	0	13	59	14	29	24	5

Appendix A4 - Borehole Data for Relocated SR 56 from 5.17 Miles East SR 135 in Salem East to the Washington-Scott County Line

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
56	- -	738+00	CL	553.3	0.0-1.0	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.0-6.0	- - - - - - - - - - -	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
57	- -	761+00	CL	------	0.4-3.2	Clay	A-7-6(14)	- -	- -	2	26	32	12	43	19	24
	- -	"	"	"	3.2-7.0	"	A-6(10)	- -	- -	0	2	49	25	35	21	14

Appendix A5 - Borehole Data for SR-135 from Palmyra to 6.6 Miles North of Palmyra

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
58	1	93+00	CL	767.4	10.0	Clay	A-7-6(20)	- -	---	0	2	29	69	79	25	54
59	1	95+00	CL	771.0	2.0	Silty clay w/chert frag.	A-6(11)	- -	---	5	10	52	34	37	20	17
	2	"	"	"	6.0	Clay w/chert frag.	A-7-6(20)	- -	- -	1	13	24	63	58	19	39
60	- -	100+35	CL	747.5	1.0-6.5	Silty clay loam w/chert frag.	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	6.5-8.0	Silty clay w/chert frag.	A-6(9)	- -	- -	- -	- -	- -	- -	- -	- -	- -
61	- -	103+00	CL	762.1	1.0-4.5	Silty clay w/ chert frag.	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	1	"	"	"	8.0	Clay w/chert frag.	A-7-6(19)	- -	- -	1	20	22	57	53	23	30
62	1	106+00	CL	774.6	4.0	Silty clay w/chert frag.	A-4(8)	- -	- -	8	7	53	31	28	18	10
	2	"	"	"	6.5-16.0	Clay w/chert frag.	A-7-6(20)	- -	- -	5	10	22	64	76	25	51
63	- -	- -	CL	769.3	1.0-5.3	Silty clay	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
64	1	113+80	CL	749.7	2.0	Silty clay loam	A-4(8)	- -	- -	2	9	60	29	26	18	8
	2	"	"	"	4.0	Silty clay w/chert frag.	A-6(9)	- -	- -	3	6	53	38	36	23	13
65	- -	119+00	CL	748.7	1.0-3.8	Silty clay loam	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	3.8-10.0	Silty clay w/chert frag.	A-6(9)	- -	- -	- -	- -	- -	- -	- -	- -	- -
66	1	125+00	12LT	765.0	4.0	Silty clay loam	A-6(8)	- -	- -	7	7	62	24	30	19	11
	- -	"	"	"	5.8-9.0	clay	A-7-6(20)	-	- -	-	- -	- -	- -	- -	- -	- -
67	1	130+00	14LT	772.5	8.0	clay	A-7-6(20)	- -	- -	3	12	31	54	68	21	47
68	1	137+00	CL	763.2	4.0	clay	A-6(9)	- -	-	6	11	50	33	30	17	13
69	- -	143+00	CL	770.3	0.6-4.5	Silty clay loam w/chert frag.	A-6(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	4.5-9.0	clay w/chert frag.	A-7-6(17)	- -	- -	- -	- -	- -	- -	- -	- -	- -

Appendix A5 - Borehole Data for SR-135 from Palmyra to 6.6 Miles North of Palmyra

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
70	- -	148+00	6RT	772.0	0.6-5.0	clay w/chert frag.	A-7-6(17)	- -	- -	- -	- -	- -	- -	- -	- -	- -
71	1	152+00	CL	772.9	6.0	clay w/chert frag.	A-7-6(17)	- -	- -	0	2	37	61	50	22	28
	- -	"	"	"	11.5-15.5	limestone	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	15.7-16.0	clay seam	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	16.0-21.0	limestone	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	21.0-21.5	clay seam	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	21.5-24.0	limestone	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	26.0-28.0	chert & clay seam	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	28.0-30.0	limestone	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
72	- -	155+00	CL	731.0	0.6-4.5	clay w/chert frag.	A-7-6(17)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	4.5-6.5	clay loam	A-6(10)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	6.5-9.0	clay w/chert frag.	A-7-6(20)	- -	- -	- -	- -	- -	- -	- -	- -	- -
73	- -	156+16	31RT	716.1	0.6-3.6	limestone	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
74	1	165+00	9RT	764.4	2.0	silty clay loam	A-4(8)	- -	- -	0	13	65	22	26	20	6
	- -	"	"	"	2.3-4.5	clay loam w/chert frag.	A-6(10)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	2	"	"	"	6.0-15.0	clay w/chert frag.	A-7-6(20)	- -	- -	6	6	20	68	80	29	51
75	- -	168+35	CL	738.3	0.8-1.5	clay	A-7-6(20)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	1.5-4.5	limestone	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
76	- -	171+50	31RT	748.2	0.6-2.5	silty clay loam	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	2.5-4.0	clay loam w/chert frag.	A-6(10)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	4.0-9.0	clay w/chert frag.	A-7-6(20)	- -	- -	- -	- -	- -	- -	- -	- -	- -
77	- -	180+00	CL	766.7	0.6-5.5	silty clay loam w/ chert frag.	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
78	- -	189+08	CL	769.9	1.0-2.0	silty clay loam	- - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Appendix A5 - Borehole Data for SR-135 from Palmyra to 6.6 Miles North of Palmyra

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
78	1	189+08	CL	769.9	2.0	silty clay loam w/chert frag.	A-6(11)	- -	- -	6	13	54	27	34	17	17
	2	"	"	"	4.0	clay loam w/chert frag.	A-6(10)	- -	- -	9	19	49	24	28	13	15
79	- -	195+00	CL	779.8	1.0-6.0	silty loam clay	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
80	- -	200+50	25LT	778.6	1.5-6.7	silty clay w/chert frag.	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
81	- -	204+50	CL	777.8	0.6-6.0	silty clay	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
82	- -	208+40	CL	780.2	0.6-6.0	silty clay	A-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
83	- -	213+00	CL	783.9	0.6-2.3	clay	A-7-6(17)	- -	- -	- -	- -	- -	- -	- -	- -	—
	1	"	"	"	6.0	silty clay	A-6(11)	- -	- -	7	7	56	30	35	17	18
84	1	219+90	CL	771.1	1.0	clay	A-7-6(17)	- -	- -	9	5	46	40	51	24	27
	2	"	"	"	6.0	"	A-7-6(15)	- -	- -	1	10	50	40	46	20	26
85	- -	225+00	CL	773.9	0.6-2.0	clay	A-7-6(17)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	1	"	"	"	4.0	clay w/chert frag.	A-6(12)	- -	- -	9	9	47	35	36	15	21
86	1	231+00	CL	782.3	2.0-9.0	silty clay w/chert frag.	A-7-6(11)	- -	- -	1	4	59	36	41	23	18
87	- -	236+60	CL	777.4	0.6-6.0	silty clay w/chert frag.	A-7-6(11)	- -	- -	- -	- -	- -	- -	- -	- -	- -
88	- -	245+00	CL	785.3	1.0-4.5	silty clay loam	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	4.5-8.0	silty clay loam	"	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	8.0-9.0	clay	A-7-6(18)	- -	- -	- -	- -	- -	- -	- -	- -	- -
89	1	251+00	CL	780.4	6.0	silty clay loam w/chert frag.	A-4(8)	- -	- -	2	5	64	30	31	22	9
	2	"	"	"	10.0	clay w/chert frag.	A-7-6(18)	- -	- -	0	32	35	33	65	23	42

Appendix A5 - Borehole Data for SR-135 from Palmyra to 6.6 Miles North of Palmyra

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
90	1	256+00	31LT	766.7	4.0	silty clay	A-6(11)	--	--	4	4	57	35	38	21	17
	--	"	"	"	6.0-8.0	clay w/chert frag.	A-7-6(18)	--	--	--	--	--	--	--	--	--
91	1	260+50	CL	768.8	4.0	clay	A-7-6(15)	--	--	2	4	47	46	47	21	26
	2	"	"	"	12.0	clay w/chert frag.	A-7-6(20)	--	--	0	5	34	61	69	21	48
92	1	268+25	CL	759.8	4.0	silty clay	A-6(9)	--	--	0	5	60	35	35	21	14
	2	"	"	"	10.0	clay w/chert frag.	A-7-6(20)	--	--	1	12	12	75	85	28	57
93	--	272+45	20LT	727.2	0.6-4.5	silty clay loam	A-4(8)	--	--	--	--	--	--	--	--	--
	--	"	"	"	4.5-9.0	clay w/chert frag.	A-7-6(19)	--	--	--	--	--	--	--	--	--
94	--	277+00	CL	725.2	0.6-6.0	silty clay loam w/	A-4(8)	--	--	--	--	--	--	--	--	--
	--	"	"	"	6.0-8.0	clay w/chert frag.	A-7-6(19)	--	--	--	--	--	--	--	--	--
95	1	284+50	CL	733.3	8.0	clay	A-7-6(19)	--	--	0	16	29	55	53	15	38
96	--	290+00	31RT	728.3	1.0-2.5	silty clay loam	A-4(8)	--	--	--	--	--	--	--	--	--
	--	"	"	"	2.5-5.0	clay w/chert frag.	A-7-6(19)	--	--	--	--	--	--	--	--	--
97	1	292+55	CL	757.7	2.0	silty clay loam	A-4(8)	--	--	7	12	57	25	29	22	7
	2	"	"	"	6.0-15.0	clay w/chert frag.	A-7-6(20)	--	--	3	4	27	66	63	23	40
98	--	292+60	31RT	756.9	19.4-19.8	limestone	-------	--	--	--	--	--	--	--	--	--
	--	"	"	"	19.8-21.0	shale	-------	--	--	--	--	--	--	--	--	--
	--	"	"	"	21.0-25.0	shaley limestone	-------	--	--	--	--	--	--	--	--	--
	--	"	"	"	25.0-34.8	limestone	-------	--	--	--	--	--	--	--	--	--
	--	"	"	"	34.8-35.8	shale	-------	--	--	--	--	--	--	--	--	--
	--	"	"	"	35.8-56.0	limestone	-------	--	--	--	--	--	--	--	--	--
99	--	292+70	31LT	758.1	22.5-27.4	limestone	-------	--	--	--	--	--	--	--	--	--
	--	"	"	"	27.4-28.0	shale	-------	--	--	--	--	--	--	--	--	--

Appendix A5 - Borehole Data for SR-135 from Palmyra to 6.6 Miles North of Palmyra

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
99	- -	292+70	31LT	758.1	28.0-51.5	limestone	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	52.0-54.0	shale	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	54.0-57.0	limestone	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
100	- -	296+50	31LT	722.4	0.6-2.5	silty clay loam	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	1	"	"	"	4.0	clay w/chert frag.	A-7-6(20)	- -	- -	3	5	21	72	78	24	54
101	1	301+10	10RT	660.6	2.0-3.5	silty clay w/rock frag.	- - - - - - -	38	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	3.5-8.5	limestone	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
102	1	301+76	10LT	645.2	2.0-3.5	silt	- - - - - - -	4	- - -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	5.5-10.5	limestone	- - - - - - -	- -	—	- -	- -	- -	- -	—	- -	- -
103	1	302+42	10RT	647.4	2.0-3.5	silt	- - - - - - -	6	- -	- -	- -	- -	- -	- -	- -	- -
	2	"	"	"	5.0-6.5	"	- - - - - - -	3	- -	- -	- -	- -	- -	- -	- -	- -
	3	"	"	"	9.5-11.0	"	- - - - - —	1	—	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	11.0-16.0	limestone	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
104	1	303+08	10LT	654.5	2.0-3.5	sandy silt	- - - - - - -	5	- -	- -	- -	- -	- -	- -	- -	- -
	2	"	"	"	5.0-6.5	"	- - - - - - -	8	- -	- -	- -	- -	- -	- -	- -	- -
	3	"	"	"	10.0-11.5	"	- - - - - - -	8	- -	—	- -	- -	- -	- -	- -	- -
	4	"	"	"	15.0-16.5	"	- - - - - - -	14	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	17.0-18.5	silty sand w/gravel	- - - - — -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	18.5-23.5	limestone	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
105	1	304+00	CL	654.4	4.0	silty clay loam	A-4(8)	- -	- -	0	6	66	29	29	19	10
	2	"	"	"	6.0	silty loam	"	- -	- -	0	22	59	18	21	19	2
	3	"	"	"	10.0	clay w/chert frag.	A-7-6(17)	- -	- -	4	15	40	42	48	19	29
106	1	310+00	31LT	686.9	6.0	silty clay	A-7-6(14)	- -	- -	3	9	52	37	48	26	22
	2	"	"	"	12.0	clay w/chert frag.	A-7-6(20)	- -	- -	0	4	43	54	61	26	35

Appendix A5 - Borehole Dita for SR-135 from Palmyra to 6.6 Miles North of Palmyra

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
107	1	314+50	31LT	701.6	2.0	silty clay loam	A-4(8)	- -	- -	8	12	55	24	24	17	7
	2	"	"	"	8.0-12.0	clay w/chert frag.	A-7-6(20)	- -	- -	0	2	34	64	62	26	36
	- -	"	"	"	16.5-18.5	shale	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	19.5-27.0	limestone	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
108	- -	318+00	31LT	697.9	1.0-3.5	silty clay loam w/chert frag.	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	1	"	"	"	10.0	clay w/chert frag.	A-7-6(20)	- -	- -	0	4	22	73	79	27	52
109	- -	321+00	45RT	690.9	1.0-6.0	clay w/chert frag.	A-7-6(20)	- -	- -	- -	- -	- -	- -	- -	- -	- -
110	1	323+50	31RT	708.8	6.0	clay w/chert frag.	A-7-6(20)	- -	- -	12	8	35	46	65	29	36
	- -	"	"	"	8.9-10.5	limestone & clay seams	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
111	- -	325+00	C1	697.5	1.0-2.7	silty clay w/chert frag.	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
112	- -	328+00	31RT	719.1	1.0-4.5	clay w/chert frag.	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	4.5-10.5	limestone	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
113	1	332+00	CL	727.3	2.0	clay w/chert frag.	A-4(8)	- -	- -	0	27	43	31	21	16	5
	2	"	"	"	8.0	"	A-7-6(19)	- -	- -	4	7	34	56	55	20	35
114	- -	335+00	31RT	727.0	1.0-5.0	clay w/chert frag.	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	5.0-10.0	"	A-7-6(19)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	10.0-11.3	limestone	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	11.6-13.1	shale & clay seams	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
115	- -	340+50	31RT	725.3	1.0-4.0	clay w/chert frag.	A-4(8)	- -	- -	- -	- -	- -	- -	- -	- -	- -
	1	"	"	"	8.0	"	A-7-6(20)	- -	- -	2	7	37	54	62	23	39
	- -	"	"	"	16.0-20.0	shaley limestone	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Appendix A5 - Borehole Data for SR-135 from Palmyra to 6.6 Miles North of Palmyra

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
116	--	344+00	CL	684.8	1.0-5.9	silty clay	------	--	--	--	--	--	--	--	--	--
	--	"	"	"	5.9-8.9	limestone	------	--	--	--	--	--	--	--	--	--
117	1	346+00	31RT	719.6	6.0	clay w/chert frag.	A-7-6(14)	--	--	17	9	38	36	44	20	24
118	--	347+60	CL	699.2	0.6-1.9	clay w/chert frag.	A-7-6(20)	--	--	--	--	--	--	--	--	--
	--	"	"	"	1.9-4.9	limestone	------	--	--	-	--	--	--	--	--	--
119	--	353+00	CL	754.9	1.0-2.0	silty clay w/chert frag.	A-6(12)	--	--	--	--	--	--	--	--	--
	--	"	"	"	2.0-7.0	clay w/chert frag.	A-7-6(20)	--	--	--	--	--	--	--	--	--
	--	"	"	"	7.0-19.0	limestone	------	--	--	--	--	--	--	--	--	--
120	1	355+--	CL	780.3	2.0	silty clay w/chert frag.	A-6(12)	--	--	0	3	61	36	37	17	20
	2	"	"	"	8.0-12.0	clay w/chert frag.	A-7-6(20)	--	--	3	5	32	60	63	19	44
	--	"	"	"	27.0-29.5	shale	------	--	--	--	--	--	--	--	--	--
	--	"	"	"	29.5-30.0	limestone	------	--	--	--	--	--	--	--	--	--
	--	"	"	"	30.0-32.0	shale & clay	------	--	--	--	--	--	--	--	--	--
	--	"	"	"	32.0-38.0	limestone	------	--	--	--	--	--	--	--	--	--
121	--	361+30	CL	738.9	1.0-3.0	silty clay w/chert frag.	A-6(12)	--	--	--	--	--	--	--	--	--
	--	"	"	"	3.0-14.0	clay w/chert frag.	A-7-6(20)	--	--	--	--	--	--	--	--	--
122	--	363+50	31LT	766.0	1.0-5.2	clay w/chert frag.	A-7-6(20)	--	--	--	--	--	--	--	--	--
	--	"	"	"	5.2-13.0	chert boulders & clay seams	------	--	--	--	--	--	--	--	--	--
123	--	367+00	31RT	761.9	1.0-7.2	clay w/chert frag.	A-7-6(20)	--	--	--	--	--	--	--	--	--
124	--	369+50	31LT	746.6	1.0-5.5	silty clay w/chert frag.	A-6(12)	--	--	--	--	--	--	--	--	--
	--	"	"	"	5.5-10.0	clay w/chert frag.	A-7-6(20)	--	--	--	--	--	--	--	--	--

APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
125	SS-1A	378+00	CL	787.3	0.0-0.3	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.3-1.5	silty clay w/ chert frag.	A-6(11-16)	18	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	chert & clay	----------	57	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	"	----------	103	--	--	--	--	--	--	--	--
	SS-4	"	"	"	7.5-9.0	silty loam & chert frag.	A-2-6	21	--	--	--	--	--	--	--	--
	SS-5	"	"	"	12.0-13.5	clay w/ chert frag.	A-7-6(16-20)	25	--	--	--	--	--	--	--	--
	SS-6	"	"	"	15.0-16.5	"	"	21	--	--	--	--	--	--	--	--
	SS-7	"	"	"	19.5-21.0	"	"	22	--	--	--	--	--	--	--	--
	SS-8	"	"	"	21.0-22.0	"	"	--	--	--	--	--	--	--	--	--
126	SS-1A	386+00	CL	786.9	0.0-0.5	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.5-1.5	silty clay w/ chert frag.	A-6(11-16)	14	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	clay w/ chert frag.	A-7-6 (20)	27	--	--	--	--	--	--	--	--
	SS-3	"	"	"	4.5-6.0	"	"	33	--	4	16	19	61	72	20	52
	BS-1	"	"	"	2.0-6.0	"	"	--	--	--	--	--	--	--	--	--
	SS-4	"	"	"	7.5-9.0	"	"	24	--	--	--	--	--	--	--	--
	SS-5	"	"	"	9.0-10.5	clay w/ sand layer	A-7-6 (20)	9	--	--	--	--	--	--	--	--
	BS-2	"	"	"	10.0-15.0	"	"	--	--	--	--	--	--	--	--	--
	SS-6	"	"	"	14.0-15.0	"	"	--	--	--	--	--	--	--	--	--
	SS-7	"	"	"	16.5-18.0	"	"	20	--	0	4	14	82	89	27	62
	SS-8	"	"	"	20.5-21.0	clay w/ limestone frag. & silt	A-6 (0-10)	--	--	--	--	--	--	--	--	--
	SS-9	"	"	"	21.5-22.0	clay w/ limestone frag.	A-6 (0-10)	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
127	SS-1A	390+00	CL	797.9	0.0-0.5	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.5-1.5	silty clay w/ chert frag.	A-6 (11-16)	12	--	--	--	--	--	--	--	--
	SS-2	"	"	"	2.0-3.0	"	"	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	"	A-4 (8)	28	--	--	--	--	--	--	--	--
	SS-4	"	"	"	6.0-7.5	"	"	31	--	5	13	51	31	24	14	10
	SS-5	"	"	"	9.0-10.5	sandy loam & chert frag.	A-2-6 (0)	34	--	--	--	--	--	--	--	--
	SS-6	"	"	"	13.5-15.0	"	"	72	--	45	21	21	13	28	16	12
	BS-1	"	"	"	9.0-15.0	"	"	--	--	--	--	--	--	--	--	--
	SS-7	"	"	"	17.5-18.0	"	"	--	--	--	--	--	--	--	--	--
	SS-8	"	"	"	22.5-24.0	clay	A-7-6(16-20)	18	--	--	--	--	--	--	--	--
	SS-9	"	"	"	24.0-25.5	clay w/ chert frag.	A-4 (5-8)	13	--	--	--	--	--	--	--	--
	SS-10	"	"	"	25.5-27.0	clay w/ limestone frag.	A-6 (10)	14	--	--	--	--	--	--	--	--
	SS-11	"	"	"	27.5-28.0	"	"	--	--	7	19	43	31	34	18	16
	NXM-12	"	"	"	28.0-31.0	clay w/ chert & limestone	----------	--	--	--	--	--	--	--	--	--
128	SS-1A	396+00	CL	745.9	0.0-0.3	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-18	"	"	"	0.3-1.5	silty clay w/ chert frag.	A-6 (11-16)	7	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	"	9	--	--	--	--	--	--	--	--
	SS-3	"	"	"	5.5-6.0	clay w/ chert frag.	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
	SS-4	"	"	"	7.5-9.0	"	"	24	--	--	--	--	--	--	--	--
	SS-5	"	"	"	12.0-13.5	clay	A-7-6(16-20)	10	--	--	--	--	--	--	--	--
	SS-6	"	"	"	13.5-15.0	"	"	16	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
129	SS-1A	400+55	CL	757.7	0.0-0.3	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.5-1.5	clay w/ chert frag.	A-6(11-16)	3	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	silty clay w/ chert frag.	A-6 (12)	22	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	"	"	14	--	6	6	54	34	38	18	20
	SS-4	"	"	"	7.5-9.0	clay	A-7-6(16-20)	18	--	--	--	--	--	--	--	--
	SS-5	"	"	"	11.0-11.5	clay w/ limestone frag.	A-6 (0-10)	--	--	--	--	--	--	--	--	--
	NXM-6	"	"	"	11.5-15.0	limestone	----------	--	--	--	--	--	--	--	--	--
130	SS-1A	404+33	CL	765.5	0.0-0.5	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.5-1.5	loam w/ chert frag.	A-4 (0-4)	21	--	--	--	--	--	--	--	--
	SS-2	"	"	"	3.0-4.5	clay w/ chert frag.	A-7-6 (20)	13	--	--	--	--	--	--	--	--
	SS-3	"	"	"	7.5-9.0	"	"	25	--	0	5	39	56	59	24	35
	SS-4	"	"	"	11.5-12.0	clay w/ limestone frag.	A-6 (0-10)	--	--	--	--	--	--	--	--	--
	SS-5	"	"	"	12.0-12.3	"	"	--	--	--	--	--	--	--	--	--
131	1	407+00	CL	798.8	0.0-0.5	topsoil	----------	--	--	--	--	--	--	--	--	--
	2	"	"	"	0.5-2.0	clay w/ chert frag.	A-4 (5-8)	--	--	--	--	--	--	--	--	--
	3	"	"	"	4.0-6.0	"	"	--	--	--	--	--	--	--	--	--
	4	"	"	"	8.0-10.0	"	"	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
132	SS-1A	413+00	CL	804.1	0.0-1.0	topsoil	----------	—	—	--	—	--	—	--	--	--
	SS-1B	"	"	"	1.0-1.5	silty clay	A-6 (0-10)	--	--	—	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	"	16	—	—	—	--	--	--	--	—
	SS-3	"	"	"	4.5-6.0	clay w/ chert frag.	A-6 (11)	38	--	10	10	45	35	35	18	17
	SS-4	"	"	"	6.0-7.5	"	"	21	--	--	--	--	--	--	--	--
	SS-5	"	"	"	9.0-10.0	sandy loam & chert frag.	A-2-6	--	--	--	--	--	--	--	--	--
133	SS-1	417+30	48RT	784.3	0.0-1.5	topsoil	----------	16	--	--	--	--	--	--	--	--
	SS-2	"	"	"	3.0-4.5	silty clay w/ chert frag.	A-6 (11-16)	19	--	—	--	--	--	--	--	--
	SS-3	"	"	"	7.5-9.0	clay w/ chert frag.	A-7-6(16-20)	20	--	--	--	--	--	--	--	--
	SS-4	"	"	"	9.0-10.5	"	"	22	--	--	--	--	--	--	--	--
	SS-5	"	"	"	12.0-13.5	"	"	93	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
134	SS-1	427+46	40LT	770.2	0.0-1.5	topsoil	----------	5	--	--	--	--	--	--	--	--
	SS-2	"	"	"	4.5-6.0	silty clay	A-6 (9)	3	--	--	--	--	--	--	--	--
	ST(S-1)	"	"	"	6.0-8.0	"	"	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	9.5-11.0	"	"	9	--	0	4	60	36	32	20	12
	SS-4	"	"	"	14.0-15.5	loam & chert frag.	A-4 (4)	39	--	39	8	37	16	27	19	8
	SS-5	"	"	"	17.0-18.5	sandy loam & chert frag.	A-2-6	43	--	--	--	--	--	--	--	--
	SS-6	"	"	"	18.5-19.0	loam & chert frag.	A-4 (0-4)	--	--	--	--	--	--	--	--	--
135	1	436+45	CL	787.4	0.0-1.4	silty clay loam	A-4 (8)	--	--	0	6	65	29	28	19	9
	2	"	"	"	1.4-2.0	"	"	--	--	--	--	--	--	--	--	--
	3	"	"	"	4.2-5.0	silty clay	A-6 (10)	--	--	0	4	63	33	36	20	16
	4	"	"	"	6.5-8.0	"	"	--	--	--	--	--	--	--	--	--
136	SS-1	439+40	CL	791.3	0.0-1.5	topsoil	----------	15	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	silty clay w/ chert frag.	A-6 (11-16)	22	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	clay w/ chert frag.	A-7-6(16-20)	22	--	--	--	--	--	--	--	--
	SS-4	"	"	"	6.0-7.5	"	"	18	--	--	--	--	--	--	--	--
	SS-5	"	"	"	9.0-10.0	"	"	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
137	1	444+80	CL	779.1	0.0-1.5	topsoil	----------	--	--	--	--	--	--	--	--	--
	2	"	"	"	1.5-1.9	silty clay loam	A-4 (5-8)	--	--	--	--	--	--	--	--	--
	3	"	"	"	1.9-3.0	silty clay	A-6 (0-10)	--	--	--	--	--	--	--	--	--
	4	"	"	"	3.0-4.0	"	"	--	--	--	--	--	--	--	--	--
	5	"	"	"	4.0-4.2	chert & silty clay	----------	--	--	--	--	--	--	--	--	--
138	SS-1	448+00	25RT	792.6	0.0-1.5	silty clay w/ chert frag.	A-6 (11-16)	6	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	clay	A-7-6 (20)	9	--	--	--	--	--	--	--	--
	SS-3	"	"	"	6.0-7.5	"	"	14	--	--	--	--	--	--	--	--
	SS-4	"	"	"	10.5-11.0	"	"	--	--	0	4	24	72	71	21	50
139	SS-1	452+35	40RT	798.1	0.0-1.5	silty clay w/ chert frag.	A-6 (11-16)	12	--	--	--	--	--	--	--	--
	SS-2	"	"	"	4.5-6.0	"	A-6 (0-10)	7	--	--	--	--	--	--	--	--
	SS-3	"	"	"	6.0-7.5	sandy loam w/ chert frag.	A-6 (0-10)	15	--	--	--	--	--	--	--	--
	SS-4	"	"	"	12.0-12.5	clay	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
140	SS-1	455+00	35RT	800.3	0.0-1.5	silty clay w/ chert frag.	A-6 (11-16)	25	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	"	32	--	--	--	--	--	--	--	--
	SS-3	"	"	"	4.5-6.0	clay w/ chert frag.	A-6 (13)	33	--	0	6	50	44	38	15	23
	SS-4	"	"	"	6.0-7.5	"	"	11	--	--	--	--	--	--	--	--
	SS-5	"	"	"	10.5-12.0	"	"	15	--	--	--	--	--	--	--	--
	SS-6	"	"	"	12.0-13.0	"	"	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
141	SS-1	459+60	30RT	789.0	0.0-1.5	silty clay w/ chert frag.	A-6 (11-16)	17	--	--	--	--	--	--	--	--
	SS-2	"	"	"	3.0-4.5	"	"	13	--	--	--	--	--	--	--	--
	SS-3	"	"	"	4.5-6.0	"	"	13	--	--	--	--	--	--	--	--
	SS-4	"	"	"	6.0-7.5	sandy loam w/ chert frag.	A-6 (4)	19	--	32	20	31	17	28	16	12
	SS-5	"	"	"	7.5-9.0	"	"	35	--	--	--	--	--	--	--	--
	SS-6	"	"	"	9.0-10.5	"	"	66	--	--	--	--	--	--	--	--
	SS-7	"	"	"	10.5-12.0	"	"	46	--	--	--	--	--	--	--	--
	SS-8	"	"	"	13.5-14.0	clay w/ chert frag.	A-6 (11-16)	--	--	--	--	--	--	--	--	--
142	SS-1	465+26	5LT	794.4	0.0-1.0	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	silty clay w/ chert frag.	A-6 (0-10)	36	--	--	--	--	--	--	--	--
	SS-3	"	"	"	5.5-6.0	clay w/ chert frag.	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
143	SS-1	470+00	CL	805.4	0.0-1.5	topsoil	----------	15	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	silty clay	A-6 (0-10)	31	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	sandy loam w/ chert frag.	A-6 (0-10)	36	--	--	--	--	--	--	--	--
	SS-4	"	"	"	6.0-7.5	clay w/ chert frag.	A-7-6(16-20)	17	--	--	--	--	--	--	--	--
	SS-5	"	"	"	9.0-10.5	"	"	12	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
144	SS-1	476+40	25RT	789.6	0.0-1.5	topsoil	----------	8	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	sandy loam w/ chert frag.	A-6 (0-10)	42	--	--	--	--	--	--	--	--
	SS-3	"	"	"	4.5-6.0	clay	A-6 (11-16)	21	--	--	--	--	--	--	--	--
	SS-4	"	"	"	9.0-10.5	clay	A-7-6(16-20)	22	--	--	--	--	--	--	--	--
145	SS-1	484+00	CL	813.8	0.0-1.5	fill	A-6 (11-16)	9	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-2.5	silty clay loam w/ chert frag.	A-4 (5-8)	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	2.5-3.0	"	"	--	--	--	--	--	--	--	--	--
	SS-4	"	"	"	4.0-4.5	silty clay w/ chert frag.	A-6 (11-16)	--	--	--	--	--	--	--	--	--
	SS-5	"	"	"	6.0-7.5	"	"	30	--	--	--	--	--	--	--	--
	SS-6	"	"	"	9.0-10.0	clay w/ chert frag.	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
146	1	491+18	CL	812.4	0.0-1.2	topsoil	----------	--	--	--	--	--	--	--	--	--
	2	"	"	"	1.2-2.0	silty clay loam	A-4 (8)	--	--	--	--	--	--	--	--	--
	3	"	"	"	3.0-4.0	"	"	--	--	0	2	78	20	30	25	5
	4	"	"	"	5.0-6.0	silty clay w/ chert frag.	A-6 (11-16)	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
147	SS-1A	496+00	CL	850.1	0.0-0.1	leaves & organic matt.	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.1-0.9	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1C	"	"	"	0.9-1.5	silty clay w/ chert frag.	A-6 (12)	--	--	--	--	--	--	--	--	--
	BS-1	"	"	"	1.0-3.0	"	"	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	"	26	--	1	9	53	37	40	20	20
	SS-3	"	"	"	3.0-4.5	chert & clay	A-7-6(16-20)	72	--	--	--	--	--	--	--	--
	SS-4	"	"	"	4.5-6.0	clay w/ chert frag.	A-7-6 (20)	52	--	2	15	21	62	64	25	39
	SS-5	"	"	"	7.5-9.0	clay w/ chert frag.	A-7-6(16-20)	49	--	--	--	--	--	--	--	--
	SS-6	"	"	"	9.0-10.5	"	"	42	--	--	--	--	--	--	--	--
	SS-7	"	"	"	13.5-15.0	"	"	36	--	--	--	--	--	--	--	--
	SS-8	"	"	"	18.0-19.5	clay w/ chert frag.	A-7-6 (20)	37	--	1	4	32	63	74	22	52
	SS-9	"	"	"	22.5-24.0	"	"	25	--	18	6	21	55	74	24	50
	SS-10	"	"	"	24.5-25.0	clay w/ limestone frag.	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
	NXM-11	"	"	"	27.0-30.0	limestone	----------	--	--	--	--	--	--	--	--	--
148	1	502+86	20LT	805.8	0.0-1.5	silty clay loam w/ chert frag.	A-4 (8)	--	--	1	10	67	22	32	25	7
	2	"	"	"	1.5-2.0	clay w/ chert frag.	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
	3	"	"	"	3.0-4.0	"	"	--	--	--	--	--	--	--	--	--
	4	"	"	"	5.0-5.5	"	"	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
149	1	508+65	15RT	811.0	0.0-0.4	fill	----------	--	--	--	--	--	--	--	--	--
	2	"	"	"	0.4-2.0	"	A-7-6 (18)	--	--	--	--	--	--	--	--	--
	3	"	"	"	5.0-6.0	"	"	--	--	2	18	33	47	51	17	34
	4	"	"	"	7.0-8.0	silty clay loam w/ gravel	A-4 (5-8)	--	--	--	--	--	--	--	--	--
	ST(S-1)	"	"	"	7.5-9.0	"	"	--	--	--	--	--	--	--	--	--
	5	"	"	"	8.0-9.0	"	"	--	--	--	--	--	--	--	--	--
	SS-6	"	"	"	12.0-13.5	clay w/ chert frag.	A-7-6(16-20)	21	--	--	--	--	--	--	--	--
150	1	512+61	15LT	814.1	0.0-0.9	silty clay w/ rock frag.	A-6 (11-16)	--	--	--	--	--	--	--	--	--
	2	"	"	"	0.9-2.0	"	"	--	--	--	--	--	--	--	--	--
	3	"	"	"	2.0-4.0	silty clay loam w/ chert frag.	A-4 (8)	--	--	12	12	51	25	28	18	10
	4	"	"	"	6.0-8.0	clay w/ chert frag.	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
151	SS-1	-----	10RT	826.2	0.0-1.0	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-2	-----	"	"	1.5-3.0	clay w/ chert frag.	A-7-6(16-20)	31	--	--	--	--	--	--	--	--
	SS-3	-----	"	"	3.0-4.5	"	"	24	--	--	--	--	--	--	--	--
	SS-4	-----	"	"	6.0-7.5	clay w/ chert frag.	A-7-6(16-20)	26	--	--	--	--	--	--	--	--
	SS-5	-----	"	"	9.7-10.0	clay	----------	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
152	Sh-1	519+00	54RT	819.7	0.0-1.7	silty clay loam w/ gravel	A-4 (5-8)	--	--	--	--	--	--	--	--	--
	Sh-2	"	"	"	2.0-4.0	"	"	--	--	--	--	--	--	--	--	--
	Ag-3	"	"	"	5.0-6.0	silty clay loam	A-4 (8)	--	--	--	--	--	--	--	--	--
	Ag-4	"	"	"	6.0-7.0	"	"	--	--	--	--	--	--	--	--	--
	Ag-5	"	"	"	7.0-9.0	"	"	--	--	0-	4-	70	26	27	18	9
	Ag-6	"	"	"	11.0-12.5	"	"	--	--	--	--	--	--	--	--	--
153	SS-1A	523+00	23LT	837.2	0.0-0.5	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.5-1.5	clay w/ chert frag.	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	4.5-6.0	"	"	22	--	--	--	--	--	--	--	--
154	SS-1A	529+00	CL	862.3	0.0-0.2	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.2-1.5	clay w/ chert frag.	A-7-6(16-20)	22	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	"	23	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	"	"	11	--	--	--	--	--	--	--	--
	SS-4	"	"	"	7.0-7.5	"		--	--	--	--	--	--	--	--	--
	SS-5	"	"	"	7.5-9.0	"	A-7-6 (19)	31	--	8	16	26	50	56	16	40
	SS-6	"	"	"	9.0-10.5	"	"	24	--	--	--	--	--	--	--	--
	SS-7	"	"	"	10.5-12.0	"	"	31	--	--	--	--	--	--	--	--
155	1	540+60	CL	825.7	0.0-1.0	clay w/ chert frag.	A-6 (11)	--	--	--	--	--	--	--	--	--
	2	"	"	"	3.0-4.0	"	"	--	--	0	5	55	40	38	21	17

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
						Texture	AASHTO			Gravel	Sand	Silt	Clay			
156	SS-1A	546+00	CL	852.7	0.0-0.5	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.5-1.5	silty clay w/ chert frag.	A-6 (11-16)	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	"	25	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	clay w/ chert frag.	A-7-6(16-20)	19	--	--	--	--	--	--	--	--
	SS-4	"	"	"	4.5-6.0	"	"	23	--	--	--	--	--	--	--	--
	SS-5	"	"	"	9.0-10.5	"	A-7-6 (20)	19	--	--	--	--	--	--	--	--
	SS-6	"	"	"	12.0-13.5	"	"	17	--	0	1	24	75	92	27	65
	SS-7	"	"	"	15.0-16.5	"	A-7-6(16-20)	21	--	--	--	--	--	--	--	--
	SS-8	"	"	"	18.0-19.5	clay	"	8	--	--	--	--	--	--	--	--
	SS-9	"	"	"	20.0-20.5	silty clay	A-4 (8)	--	--	0	4	66	30	31	22	9
	SS-10	"	"	"	20.5-21.0	shale	----------	--	--	--	--	--	--	--	--	--
157	SS-1A	550+00	CL	821.2	0.0-1.0	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	1.0-1.5	clay w/ chert frag.	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	3.0-4.5	"	"	13	--	--	--	--	--	--	--	--
	SS-3A	"	"	"	6.0-7.0	"	"	--	--	--	--	--	--	--	--	--
	SS-3B	"	"	"	7.0-7.5	"	"	--	--	--	--	--	--	--	--	--
	SS-4	"	"	"	7.5-8.5	"	"	--	--	--	--	--	--	--	--	--
158	SS-1	553+50	CL	815.7	0.0-0.9	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	clay w/ chert frag.	A-7-6(16-20)	21	--	--	--	--	--	--	--	--
	SS-3A	"	"	"	3.0-4.0	silty clay	A-4 (5-8)	--	--	--	--	--	--	--	--	--
	SS-3B	"	"	"	4.0-4.5	clay w/ chert frag.	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
	SS-4	"	"	"	6.0-7.5	silty clay w/ chert frag.	A-4 (5-8)	19	--	--	--	--	--	--	--	--
	SS-5	"	"	"	7.5-9.0	clay	A-7-6(16-20)	12	--	--	--	--	--	--	--	--
	SS-6	"	"	"	10.5-12.0	silty clay w/ sand	A-4 (8)	57	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
159	1	558+00	CL	758.1	0.0-0.9	topsoil	----------	--	--	--	--	--	--	--	--	--
	2	"	"	"	0.9-2.0	silty clay w/ chert frag.	A-6 (11-16)	--	--	--	--	--	--	--	--	--
	3	"	"	"	3.0-5.0	clay w/ chert frag.	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
	4	"	"	"	7.0-8.0	"	"	--	--	--	--	--	--	--	--	--
160	SS-1	563+20	CL	719.3	0.0-1.5	topsoil	----------	10	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	silty clay loam w/ chert frag.	A-4 (5-8)	17	--	--	--	--	--	--	--	--
	SS-3	"	"	"	4.5-6.0	"	"	22	--	--	--	--	--	--	--	--
	SS-4	"	"	"	6.0-7.5	clay w/ chert frag.	A-7-6(16-20)	15	--	--	--	--	--	--	--	--
	SS-5	"	"	"	9.0-10.5	silty clay loam w/ limestone frag.	A-4 (5-8)	14	--	--	--	--	--	--	--	--
	SS-6	"	"	"	12.5-13.5	shale & limestone frag.	----------	--	--	--	--	--	--	--	--	--
161	1	568+00	CL	706.8	0.0-2.0	clay	A-7-6(19)	--	--	--	--	--	--	--	--	--
	2	"	"	"	4.0-5.5	"	"	--	--	0	7	38	55	54	21	33

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring	Sample	Station	Offset	Ground	Sample	Soil Description		Blow	RQD	Grain Size Distribution						
No.	No.	No.	Ft.	Elevation Ft.	Depth Ft.	Texture	AASHTO	per Ft.	%	Gravel	Sand	Silt	Clay	LL	PL	PI
162	SS-1	570+00	CL	680.9	0.0-1.5	silty clay loam	A-4 (5-8)	9	--	--	--	--	--	--	--	--
	SS-2	"	"	"	2.0-3.5	"	A-4 (8)	5	--	--	--	--	--	--	--	--
	ST(S1)	"	"	"	2.0-4.0	"	"	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	4.0-5.5	"	"	5	--	0	4	74	22	32	23	9
	ST(S2)	"	"	"	5.5-7.5	"	"	--	--	--	--	--	--	--	--	--
	ST(S3)	"	"	"	7.5-9.5	sandy loam w/ rock frag.	A-2-4(0)	--	--	30	44	19	7	21	20	1
	SS-4A	"	"	"	8.0-8.5	"	----------	--	--	--	--	--	--	--	--	--
	SS-4B	"	"	"	8.5-9.0	"	A-2-4	--	--	--	--	--	--	--	--	--
	SS-5	"	"	"	10.0-11.0	"	"	--	--	--	--	--	--	--	--	--
	NXM-6	"	"	"	11.0-16.0	limestone	----------	--	--	--	--	--	--	--	--	--
163	SS-1	571+00	100RT	681.5	0.0-1.5	silty clay loam	A-4 (5-8)	4	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	"	6	--	--	--	--	--	--	--	--
	ST(S1)	"	"	"	3.0-5.0	"	"	--	--	--	--	--	--	--	--	--
	ST(S2)	"	"	"	5.0-6.5	"	"	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	6.5-8.0	sandy loam w/ gravel	A-2-4	18	--	--	--	--	--	--	--	--
	SS-4	"	"	"	9.0-10.5	"	"	17	--	--	--	--	--	--	--	--
	SS-5	"	"	"	11.5-12.0	limestone frag.	----------	--	--	--	--	--	--	--	--	--
164	SS-1	571+00	100RT	681.7	0.0-1.5	silty clay loam	A-4 (5-8)	3	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	"	6	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	"	"	3	--	--	--	--	--	--	--	--
	ST(S1)	"	"	"	5.0-7.0	"	"	--	--	--	--	--	--	--	--	--
	SS-4	"	"	"	7.0-8.5	sandy loam w/ gravel	A-2-4	7	--	--	--	--	--	--	--	--
	SS-5	"	"	"	9.5-11.0	"	"	21	--	--	--	--	--	--	--	--
	SS-6	"	"	"	12.0-12.5	limestone frag.	----------	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
165	SS-1	572+00	100LT	683.0	0.0-1.5	clay loam	A-4 (5-8)	3	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	"	4	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	"	"	4	--	--	--	--	--	--	--	--
	ST(S1)	"	"	"	5.0-7.0	"	"	--	--	--	--	--	--	--	--	--
	SS-4	"	"	"	7.0-7.5	silty loam w/ organic matter	A-4 (5-8)	--	--	--	--	--	--	--	--	--
	SS-5	"	"	"	7.5-8.5	sandy loam w/ gravel & sand	A-4 (2)	--	--	32	25	33	10	27	20	7
	ST(S2)	"	"	"	8.5-9.5	"	"	--	--	--	--	--	--	--	--	--
	SS-6	"	"	"	9.5-11.0	sandy loam w/ gravel	A-2-4	23	--	--	--	--	--	--	--	--
	SS-7	"	"	"	11.0-12.5	"	"	27	--	--	--	--	--	--	--	--
	SS-8	"	"	"	12.5-14.0	"	"	26	--	--	--	--	--	--	--	--
	SS-9	"	"	"	14.5-14.8	limestone frag.	----------	--	--	--	--	--	--	--	--	--
166	SS-1	572+00	100RT	684.1	0.0-1.5	silty clay loam	A-4 (5-8)	2	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	"	3	--	--	--	--	--	--	--	--
	ST(S1)	"	"	"	3.0-5.0	"	"	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	5.0-6.5	"	"	2	--	--	--	--	--	--	--	--
	ST(S2)	"	"	"	7.0-9.0	"	"	--	--	--	--	--	--	--	--	--
	SS-4	"	"	"	9.0-9.5	silty loam w/ organic matter	A-4 (8)	--	--	--	--	--	--	--	--	--
	SS-5	"	"	"	9.5-10.5	"	"	--	--	0	12	72	16	29	23	6
	ST(S3)	"	"	"	11.0-13.0	"	"	--	--	--	--	--	--	--	--	--
	SS-6	"	"	"	13.0-14.0	sandy loam w/ gravel	A-2-4	--	--	--	--	--	--	--	--	--
	SS-7	"	"	"	14.0-14.5	"	"	--	--	--	--	--	--	--	--	--
	SS-8	"	"	"	15.0-15.4	limestone frag.	----------	--	--	--	--	--	--	--	--	--
	SS-9	"	"	"	16.0-16.1	"	----------	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
167	1	577+00	CL	741.9	0.0-0.8	topsoil	----------	--	--	--	--	--	--	--	--	--
	2	"	"	"	0.8-2.0	clay w/ chert frag.	A-7-6(16-20)	--	---	--	--	--	--	--	--	--
	3	"	"	"	2.0-3.0	"	"	--	--	--	--	--	--	--	--	--
168	SS-1	584+00	CL	797.9	0.0-1.5	topsoil	----------	14	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	ailty clay w/ chert frag.	A-7-6(11-16)	26	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	clay	A-7-6(16-20)	9	--	--	--	--	--	--	--	--
	SS-4	"	"	"	4.5-6.0	clay w/ chert frag.	"	24	--	--	--	--	--	--	--	--
	SS-5	"	"	"	6.0-7.5	"	"	18	--	--	--	--	--	--	--	--
	SS-6	"	"	"	9.0-10.5	"	"	13	--	--	--	--	--	--	--	--
	SS-7	"	"	"	13.5-15.0	"	"	20	--	--	--	--	--	--	--	--
	SS-8	"	"	"	15.0-16.5	"	"	13	--	--	--	--	--	--	--	--
	SS-9	"	"	"	18.0-19.5	silty clay w/ silt lenses	"	9	--	--	--	--	--	--	--	--
	SS-10	"	"	"	20.5-21.0	clay w/ chert frag.	"	--	--	--	--	--	--	--	--	--
	SS-11	"	"	"	21.0-22.5	"	"	12	--	--	--	--	--	--	--	--
	SS-12A	"	"	"	22.5-23.3	"	"	--	--	--	--	--	--	--	--	--
	SS-12B	"	"	"	23.3-23.5	shale	----------	--	--	--	--	--	--	--	--	--
169	1	588+50	CL	769.8	0.0-0.5	topsoil	----------	--	--	--	--	--	--	--	--	--
	2	"	"	"	0.5-1.5	silty clay w/ chert frag.	A-6 (11-16)	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
170	SS-1	591+80	CI.	791.5	0.0-1.5	topsoil	----------	14	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	silty clay w/ chert frag.	A-6 (11)	27	--	1	9	56	34	36	18	18
	SS-3	"	"	"	6.0-7.5	"	"	16	--	--	--	--	--	--	--	--
	SS-4	"	"	"	7.5-9.0	clay w/ chert frag.	A-7-6(8-15)	37	--	--	--	--	--	--	--	--
	SS-5	"	"	"	12.0-13.5	clay	A-7-6(16-20)	16	--	--	--	--	--	--	--	--
	SS-6	"	"	"												
171	SS-1	596+74	CI.	759.2	0.0-1.2	silty clay w/ chert frag.	A-6 (11-16)	67	--	--	--	--	--	--	--	--
	NXM-2	"	"	"	3.0-8.0	limestone	----------	--	--	--	--	--	--	--	--	--
172	SS-1	602+88	CI.	788.7	0.0-0.5	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	0.5-1.5	silty clay w/ chert frag.	A-6(11-16)	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	1.5-3.0	clay w/ chert frag.	A-7-6(18)	30	--	--	--	--	--	--	--	--
	SS-4	"	"	"	3.0-4.5	"	"	29	--	--	--	--	--	--	--	--
	SS-5	"	"	"	4.5-6.0	"	"	48	--	--	--	--	--	--	--	--
	SS-6	"	"	"	6.0-7.5	"	"	23	--	14	18	19	49	61	23	38

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
173	SS-1A	606+40	CL	819.9	0.0-0.8	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.8-1.5	silty clsy w/ chert frag.	A-6(11-16)	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	"	26	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	clay w/ chert frag.	A-7-6(16-20)	21	--	--	--	--	--	--	--	--
	SS-4	"	"	"	7.5-9.0	clay w/ silty lenses & chert frag.	A-7-6(8-15)	38	--	--	--	--	--	--	--	--
	SS-5	"	"	"	12.0-13.5	clay w/ chert frag.	A-7-6(16-20)	26	--	--	--	--	--	--	--	--
	SS-6	"	"	"	15.0-16.5	clay w/ silt & sand lenses	A-7-6(15)	27	--	0	21	39	40	42	16	26
	SS-7	"	"	"	18.0-19.5	silty clay w/ silt lenses	A-7-6(16)	34	--	0	5	53	42	46	20	26
	SS-8	"	"	"	22.5-23.0	clay w/ silt & sand lenses	A-7-6(8-15)	--	--	--	--	--	--	--	--	--
174	SS-1A	612+65	CL	790.2	0.0-0.2	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.2-1.5	silty clay w/ chert frag.	A-6(11-16)	21	--	--	--	--	--	--	--	--
	SS-2	"	"	"	3.0-4.5	"	"	16	--	--	--	--	--	--	--	--
	SS-3	"	"	"	6.0-7.5	silty clay w/ silt lenses & chert frag.	A-7-6(16-20)	15	--	--	--	--	--	--	--	--
	SS-4	"	"	"	10.5-12.0	clay w/ silt lenses	A-7-6(20)	14	--	0	10	25	65	73	26	47
	SS-5	"	"	"	12.5-12.6	layered shale & limestone	----------	--	--	--	--	--	--	--	--	--
175	SS-1A	616+25	CL	794.6	0.0-0.2	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.2-1.5	clay w/ chert frag.	A-7-6(16-20)	16	--	--	--	--	--	--	--	--
	SS-2	"	"	"	4.5-6.0	clay w/ silt lenses	A-7-6(16)	17	--	--	--	--	--	--	--	--
	SS-3	"	"	"	6.0-7.5	"	"	14	--	0	17	39	44	46	18	28
	SS-4	"	"	"	8.9-9.0	shale	----------	--	--	--	--	--	--	--	--	--
	NXM-5	"	"	"	10.0-15.0	limestone	----------	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
176	SS-1A	622+00	CL	834.9	0.0-0.4	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.4-1.5	clay w/ chert frag.	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	4.5-6.0	clay	"	25	--	--	--	--	--	--	--	--
	SS-3	"	"	"	6.0-6.5	"	"	--	--	--	--	--	--	--	--	--
	NXM-4	"	"	"	6.5-11.0	limestone	----------	--	--	--	--	--	--	--	--	--
	NXM-5	"	"	"	11.0-14.0	"	----------	--	--	--	--	--	--	--	--	--
177	SS-1	627+00	CL	814.8	0.0-1.5	fill	A-6(11-16)	14	--	--	--	--	--	--	--	--
	SS-2	"	"	"	3.0-4.5	silty clay loam	A-6(0-10)	8	--	--	--	--	--	--	--	--
	SS-3	"	"	"	6.0-7.5	clay w/ chert frag.	A-6(11-16)	8	--	--	--	--	--	--	--	--
	SS-4	"	"	"	11.0-12.0	"	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
	SS-5	"	"	"	13.5-15.0	"	A-6(11-16)	30	--	--	--	--	--	--	--	--
178	SS-1	634+00	CL	848.0	0.0-1.5	topsoil	----------	15	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	clay w/ limestone frag.	A-7-6(16-20)	11	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	"	"	14	--	--	--	--	--	--	--	--
	SS-4	"	"	"	4.5-6.0	"	"	46	--	--	--	--	--	--	--	--
	NXM-5	"	"	"	6.0-10.0	limestone	----------	--	--	--	--	--	--	--	--	--
	NXM-6	"	"	"	10.0-14.0	"	----------	--	--	--	--	--	--	--	--	--
	NXM-7	"	"	"	14.0-17.0	"	----------	--	--	--	--	--	--	--	--	--
179	SS-1	637+00	4LT	829.2	0.0-1.5	clay w/ chert frag.	A-6(11-16)	14	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	A-7-6(19)	35	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	"	"	28	--	2	9	41	48	53	18	35
	SS-4	"	"	"	6.0-7.0	"	"	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
180	SS-1	643+00	CL	802.8	0.0-1.5	clay fill	A-6(11-16)	12	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	ailty clay loam	A-6(9)	8	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	"	"	5	--	0	5	66	29	34	21	13
	SS-4	"	"	"	4.5-6.0	clay w/ chert frag.	A-6(11-16)	13	--	--	--	--	--	--	--	--
181	SS-1	647+00	CL	795.1	0.0-1.5	fill	----------	11	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	ailty clay loam	A-6(0-10)	10	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	clay w/ chert frag.	A-7-6(16-20)	10	--	--	--	--	--	--	--	--
	SS-4	"	"	"	7.5-8.9	"	A-6(11)	--	--	9	21	40	30	35	15	20

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
182	SS-1	653+55	CL	758.5	0.0-1.5	fill	----------	16	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	fill	----------	18	--	--	--	--	--	--	--	--
	NXM-3	"	"	"	4.0-7.0	"	----------	--	--	--	--	--	--	--	--	--
	NXM-4	"	"	"	7.0-10.0	limestone	----------	--	--	--	--	--	--	--	--	--
183	SS-1	656+50	CL	766.1	0.0-1.0	clay w/ chert frag.	A-6(11-16)	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-2.0	shale	----------	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-3.8	"	----------	--	--	--	--	--	--	--	--	--
184	SS-1	662+00	CL	786.0	0.0-1.5	fill	----------	11	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	fill	----------	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.0	"	----------	--	--	--	--	--	--	--	--	--
	NXM-4	"	"	"	4.0-9.0	limestone	----------	--	--	--	--	--	--	--	--	--
	NXM-5	"	"	"	9.0-13.0	"	----------	--	--	--	--	--	--	--	--	--
	NXM-6	"	"	"	13.0-18.0	"	----------	--	--	--	--	--	--	--	--	--
	NXM-7	"	"	"	18.0-23.0	limestone to shale	----------	--	--	--	--	--	--	--	--	--
	NXM-8	"	"	"	23.0-25.0	shale to limestone	----------	--	--	--	--	--	--	--	--	--
	NXM-9	"	"	"	25.0-30.0	limestone & shale	----------	--	--	--	--	--	--	--	--	--
185	SS-1	667+00	CL	762.4	0.0-1.5	fill	----------	11	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-2.3	"	----------	--	--	--	--	--	--	--	--	--
186	1	672+00	7RT	726.8	0.0-0.4	fill	----------	--	--	--	--	--	--	--	--	--
	2	"	"	"	0.4-2.0	"	A-7-6(8-15)	--	--	--	--	--	--	--	--	--
	3	"	"	"	5.0-5.5	"	----------	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
187	SS-1	676+00	83LT	701.0	0.0-0.5	topaoil	----------	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	0.5-1.5	clay w/ limestone frag.	A-7-6(8-15)	12	--	--	--	--	--	--	--	--
	SS-3	"	"	"	1.5-3.0	"	"	48	--	--	--	--	--	--	--	--
	NXM-4	"	"	"	3.0-8.0	limestone	----------	--	--	--	--	--	--	--	--	--
	NXM-5	"	"	"	8.0-13.0	"	----------	--	--	--	--	--	--	--	--	--
	NXM-6	"	"	"	13.0-18.0	"	----------	--	--	--	--	--	--	--	--	--
188	1	682+00	CL	721.2	0.0-2.0	topsoil	----------	--	--	--	--	--	--	--	--	--
	2	"	"	"	2.0-4.0	clay w/ chert frag.	A-7-6(17)	--	--	4	14	29	53	50	22	28
	3	"	"	"	4.0-5.0	"	"	--	--	--	--	--	--	--	--	--
189	SS-1A	687+00	CL	758.3	0.0-0.4	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.4-1.5	clay	A-7-6(16-20)	16	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	clay w/ chert frag.	A-7-6(8-15)	58	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.0	limestone	----------	--	--	--	--	--	--	--	--	--
190	SS-1	692+00	CL	780.8	0.0-1.0	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-2A	"	"	"	1.5-2.5	clay w/ chert frag.	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
	SS-2B	"	"	"	2.5-3.0	clay loam	A-4(5-8)	--	--	--	--	--	--	--	--	--
	BS-1	"	"	"	2.5-3.5	"	"	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.5-3.8	shale	----------	--	--	--	--	--	--	--	--	--
	SS-4	"	"	"	4.0-9.0	limestone	----------	--	--	--	--	--	--	--	--	--
	SS-5	"	"	"	9.0-14.0	"	----------	--	--	--	--	--	--	--	--	--
191	SS-1	696+00	CL	796.5	0.0-1.0	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.0-1.5	clay	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	1.5-2.5	"	"	100	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
192	SS-1A	700+29	CL	779.9	0.0-0.5	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.5-1.5	silty clay	A-7-6(8-15)	16	--	--	--	--	--	--	--	--
	SS-2A	"	"	"	1.5-2.5	clay	A-6(0-10)	--	--	--	--	--	--	--	--	--
	SS-2B	"	"	"	2.5-3.0	limestone	----------	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-3.5	"	----------	--	--	--	--	--	--	--	--	--
	NXM-4	"	"	"	4.0-9.0	"	----------	--	--	--	--	--	--	--	--	--
193	2	----	----	-----	1.5-3.0	silty clay w/ silt lenses	A-7-6(13)	--	--	0	1	60	39	42	20	22
194	SS-1A	710+21	91.T	874.2	0.0-1.0	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	1.0-1.5	clay w/ chert frag.	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
	BS-1	"	"	"	1.5-6.0	"	"	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	"	22	--	--	--	--	--	--	--	--
	SS-3	"	"	"	4.5-6.0	"	"	15	--	--	--	--	--	--	--	--
	SS-4	"	"	"	6.0-7.5	"	A-7-6(20)	18	--	--	--	--	--	--	--	--
	SS-5	"	"	"	9.0-10.5	"	"	13	--	5	2	32	61	62	22	40
	SS-6	"	"	"	12.0-13.5	"	A-7-6(15)	12	--	10	20	28	42	44	16	28
	SS-7	"	"	"	13.5-15.0	"	A-7-6(16-20)	15	--	--	--	--	--	--	--	--
	SS-8	"	"	"	15.0-16.5	"	"	17	--	--	--	--	--	--	--	--
	SS-9	"	"	"	18.0-19.5	"	"	9	--	--	--	--	--	--	--	--
	SS-10	"	"	"	19.5-20.5	"	"	--	--	--	--	--	--	--	--	--
	SS-11	"	"	"	21.0-22.5	"	"	15	--	--	--	--	--	--	--	--
	SS-12	"	"	"	22.5-23.0	"	"	--	--	--	--	--	--	--	--	--
	SS-13	"	"	"	23.0-23.2	silty clay loam	A-4(8)	--	--	--	--	--	--	--	--	--
	SS-14	"	"	"	23.2-24.0	"	"	--	--	0	12	64	24	28	22	6
	SS-15	"	"	"	24.0-24.5	shale	----------	--	--	--	--	--	--	--	--	--
	NXM-16	"	"	"	27.0-32.0	"	----------	--	--	--	--	--	--	--	--	--
	NXM-17	"	"	"	32.0-35.0	"	----------	--	--	--	--	--	--	--	--	--
	NXM-18	"	"	"	35.0-40.0	limestone	----------	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
195	SS-1	715+80	CL	840.3	0.0-1.5	topsoil	----------	10	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	clay	A-7-6(16-20)	13	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-4.5	clay w/ chert frag.	A-7-6(8-15)	28	--	--	--	--	--	--	--	--
	SS-4	"	"	"	4.5-6.0	"	"	30	--	--	--	--	--	--	--	--
196	SS-1A	720+00	CL	846.0	0.0-1.0	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	1.0-1.5	clay	A-7-6(16-20)	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	clay w/ chert frag.	"	15	--	--	--	--	--	--	--	--
	SS-3	"	"	"	5.5-6.0	clay	A-7-6(19)	--	--	0	2	43	55	57	21	36
	SS-4	"	"	"	7.5-9.0	"	"	18	--	--	--	--	--	--	--	--
197	SS-1	729+12	CL	828.9	0.0-1.5	silty clay loam	A-4(5-8)	9	--	--	--	--	--	--	--	--
	SS-2	"	"	"	4.5-6.0	silty clay	A-6(9)	11	--	0	2	62	36	33	20	13
198	SS-1A	731+00	CL	838.5	0.0-0.5	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.5-1.5	clay w/ chert frag.	A-6(11-16)	18	--	--	--	--	--	--	--	--
	SS-2	"	"	"	2.5-3.0	limestone	----------	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	3.0-3.5	clay w/ limestone frag.	A-6(11-16)	--	--	--	--	--	--	--	--	--
	SS-4	"	"	"	4.5-4.8	limestone	----------	--	--	--	--	--	--	--	--	--
	SS-5	"	"	"	5.0-10.0	"	----------	--	--	--	--	--	--	--	--	--
	SS-6	"	"	"	10.0-15.0	"	----------	--	--	--	--	--	--	--	--	--
	SS-7	"	"	"	15.0-16.0	"	----------	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
199	SS-1	734+98	CL	811.2	0.0-1.5	silty clay loam	A-4(5-8)	4	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	"	"	5	--	--	--	--	--	--	--	--
	SS-3	"	"	"	4.5-6.0	silty clay w/ chert frag.	A-6(0-10)	10	--	--	--	--	--	--	--	--
	SS-4	"	"	"	6.0-7.5	clay w/ chert frag.	A-7-6(8-15)	9	--	--	--	--	--	--	--	--
	SS-5	"	"	"	8.5-9.0	limestone	----------	--	--	--	--	--	--	--	--	--
200	SS-1A	737+09	3LT	819.1	0.0-0.5	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.5-1.5	clay	A-6(11-16)	15	--	--	--	--	--	--	--	--
	SS-2	"	"	"	3.0-4.5	"	A-7-6(16-20)	18	--	--	--	--	--	--	--	--
	SS-3	"	"	"	6.0-7.5	"	"	16	--	--	--	--	--	--	--	--
	SS-4	"	"	"	10.5-12.0	clay w/ chert frag.	A-7-6(8-15)	35	--	--	--	--	--	--	--	--
	SS-5	"	"	"	13.5-15.0	"	A-7-6(16-20)	30	--	--	--	--	--	--	--	--
201	SS-1	743+00	CL	803.1	0.0-1.0	topsoil	----------	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	clay w/ chert frag.	A-7-6(16-20)	13	--	--	--	--	--	--	--	--
	SS-3	"	"	"	4.0-4.3	silty loam w/ shale	A-4(7)	--	--	0	31	57	12	NP	NP	NP
	NXM-4	"	"	"	5.0-10.0	limestone	----------	--	--	--	--	--	--	--	--	--
	NXM-5	"	"	"	10.0-15.0	"	----------	--	--	--	--	--	--	--	--	--
	NXM-6	"	"	"	15.0-16.5	"	----------	--	--	--	--	--	--	--	--	--
202	SS-1	748+00	CL	761.3	0.0-1.5	topsoil	----------	17	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.5-3.0	silty clay loam w/ limestone frag.	A-4(5-8)	25	--	--	--	--	--	--	--	--
	NXM-3	"	"	"	4.5-9.5	limestone w/ shale	----------	--	--	--	--	--	--	--	--	--

"APPENDIX A6: BOREHOLE DATA FOR RELOCATED SR-135"

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
						Texture	AASHTO			Gravel	Sand	Silt	Clay			
203	SS-1	752+00	CL	811.6	0.0-1.0	fill	----------	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.0-1.5	clay	A-7-6(20)	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	1.5-3.0	"	"	18	--	--	--	--	--	--	--	--
	SS-4	"	"	"	3.0-4.5	"	"	15	--	--	--	--	--	--	--	--
	SS-5	"	"	"	4.5-6.0	"	"	13	--	0	5	23	72	65	22	43
	SS-6	"	"	"	6.0-7.5	"	"	11	--	--	--	--	--	--	--	--
	SS-7	"	"	"	7.5-9.0	"	"	16	--	--	--	--	--	--	--	--
	SS-8	"	"	"	9.0-10.5	"	"	12	--	--	--	--	--	--	--	--
	SS-9	"	"	"	10.5-12.0	"	"	13	--	--	--	--	--	--	--	--
	SS-10	"	"	"	12.0-13.5	"	"	9	--	--	--	--	--	--	--	--
	SS-11	"	"	"	13.5-15.0	"	"	36	--	--	--	--	--	--	--	--
	NXM-12	"	"	"	15.0-20.0	limestone	----------	--	--	--	--	--	--	--	--	--
204	SS-1A	756+00	3RT	812.1	0.0-0.2	crushed limestone	----------	--	--	--	--	--	--	--	--	--
	SS-1B	"	"	"	0.2-1.5	clay w/ chert frag.	A-6(12)	13	--	6	9	45	40	40	18	22
	SS-2	"	"	"	3.0-4.5	"	A-7-6(12)	12	--	32	17	14	37	66	22	44
	BS-1	"	"	"	4.0-6.0	"	"	--	--	--	--	--	--	--	--	--
	SS-3	"	"	"	4.5-6.0	"	"	16	--	--	--	--	--	--	--	--
	SS-4	"	"	"	9.0-10.5	"	"	9	--	--	--	--	--	--	--	--
	SS-5	"	"	"	11.0-11.5	silty loam w/ shale	A-4(5-8)	--	--	--	--	--	--	--	--	--
	NXM-6	"	"	"	12.0-17.0	limestone	----------	--	--	--	--	--	--	--	--	--
	NXM-7	"	"	"	17.0-18.0	"	----------	--	--	--	--	--	--	--	--	--

Appendix A7: Borehole Data for SR 335 over Little Bear Creek

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
205	1	239+05	17LT	469.5	1.0-2.1	Sandy Clay Loam	- -	4	- -	- -	- -	- -	- -	- -	- -	- -
	2	"	"	"	2.1-3.0	"	- -	100	- -	- -	- -	- -	- -	- -	- -	- -
	Run 1	"	"	"	3.0-9.2	Silty Clay Loam to Limestone	- -	- -	49	- -	- -	- -	- -	- -	- -	- -
206	1	238+39	28LT	478.0	1.0-2.5	Silty Clay Loam	A-6	2	- -	- -	- -	- -	- -	- -	- -	- -
	2	"	"	"	3.4-4.2	Clay	A-7-6	100	- -	- -	- -	- -	- -	- -	- -	- -
	Run 1	"	"	"	4.2-9.1	Limestone	- -	- -	- -	73	- -	- -	- -	- -	- -	- -
207	1	239+40	17RT	471.1	1.0-3.6	Silty Clay Loam	A-6	7	- -	- -	- -	- -	- -	- -	- -	- -
	Run 1	"	"	"	3.6-8.8	Limestone	- -	- -	38	- -	- -	- -	- -	- -	- -	- -
208	Run 1	238+80	17RT	473.0	1.1-5.8	Limestone	- -	- -	75	- -	- -	- -	- -	- -	- -	- -
209	1	224+00	30RT	506.5	1.0-2.5	Silty Clay Loam	A-6	10	- -	- -	- -	- -	- -	- -	- -	- -
	2	"	"	"	3.5-5.0	Clay	A-7-6	18	- -	- -	- -	- -	- -	- -	- -	- -
	3	"	"	"	6.0-7.5	Clay	"	27	- -	- -	- -	- -	- -	- -	- -	- -
210	1	230+00	CL	509.0	1.0-2.5	Clay	A-7-6	14	- -	- -	- -	- -	- -	- -	- -	- -
	2	"	"	"	3.5-5.0	Clay	"	10	- -	- -	- -	- -	- -	- -	- -	- -
	3	"	"	"	6.0-7.5	Clay	A-7-5	15	- -	- -	- -	- -	- -	- -	- -	- -
	4	"	"	"	8.5-10.0	Clay	"	11	- -	- -	- -	- -	- -	- -	- -	- -
	Run 1	"	"	"	11.0-16.0	Limestone w/shale seam	- -	- -	81	- -	- -	- -	- -	- -	- -	- -
	Run 2	"	"	"	16.0-25.0	Shale w/limestone seam	- -	- -	94	- -	- -	- -	- -	- -	- -	- -
211	BS 1	227+00	CL	496.5	1.0-2.0	Clay	A-7-5 (45)	- -	- -	1	6	23	70	82	45	37
212	1	236+00	CL	492.4	1.0-2.5	Silty Clay Loam	A-6(13)	11	- -	0	22	56	22	40	23	17
	2	"	"	"	3.5-5.0	Clay	A-7-6	12	- -	- -	- -	- -	- -	- -	- -	- -
	3	"	"	"	6.0-7.5	Clay	A-7-5	17	- -	- -	- -	- -	- -	- -	- -	- -
	4	"	"	"	8.5-10.0	Clay	"	16	- -	- -	- -	- -	- -	- -	- -	- -
	Run 1	"	"	"	12.5-15.0	Limestone	- -	- -	88	- -	- -	- -	- -	- -	- -	- -

Appendix A7 - Borehole Data for SR 335 over Little Bear Creek

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
213	Run 1	242+00	CL	475.6	1.0-6.0	Limestone	- -	- -	71	- -	- -	- -	- -	- -	- -	- -
214	1	246+00	CL	512.3	1.0-2.5	Clay	A-7-6	9	- -	- -	- -	- -	- -	- -	- -	- -
	2	"	"	"	3.5-5.0	Clay	A-7-6	12	- -	- -	- -	- -	- -	- -	- -	- -
	3	"	"	"	6.0-7.5	Clay	A-7-6(15)	13	- -	10	29	26	35	51	23	28
	4	"	"	"	8.5-10.0	Clay	A-7-6	18	- -	- -	- -	- -	- -	- -	- -	- -
	5	"	"	"	13.5-15.0	Clay	"	6	- -	- -	- -	- -	- -	- -	- -	- -
	6	"	"	"	18.5-20.0	Clay	"	15	- -	- -	- -	- -	- -	- -	- -	- -
215	- -	228+00	CL	503.0	0.0-6.5	Clay	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
216	- -	229+00	CL	510.0	0.0-7.5	Clay	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
217	- -	231+00	CL	510.0	0.0-7.5	Clay	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
218	- -	232+00	CL	493.0	0.0-4.2	Clay	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
219	- -	238+53	17RT	479.0	0.0-4.0	Silty Clay Loam	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
220	- -	238+74	17RT	468.0	0.0-1.0	Silty Clay Loam	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
221	- -	239+15	17RT	470.0	0.0-3.5	Silty Clay Loam	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
222	- -	239+30	17LT	471.0	0.0-4.0	Silty Clay Loam	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
223	- -	240+50	50RT	473.0	0.0-5.0	Silty Clay Loam	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
224	- -	244+00	45RT	491.0	0.0-2.5	Silty Clay Loam	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	2.5-8.2	Sandy Loam	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
225	- -	248+00	25LT	512.0	0.0-5.0	Silty Clay Loam	- -	--	- -	- -	- -	- -	- -	- -	- -	- -

Appendix A8 - Borehole Data for SR 39, 4 Mi. North Little York

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
226	1	271+03	CL	520.8	1.0-3.5	Silty clay loam to Silty clay	— - - -	8	- -	- -	- -	- -	- -	- -	-	- -
	2	"	"	"	3.5-6.0	"	- - - - - -	10	- -	-	- -	- -	- -	- -	- -	- -
	3	"	"	"	6.0-8.5	"	A-7 6(6)	15	-	0	3	51	28	46	26	20
	4	"	"	"	8.5-13.5	"	A-7-6(6)	9	- -	0	3	51	28	46	26	20
	5	"	"	"	13.5-18.5	Silty clay	- - - - -	5	- -	- -	- -	- -	- -	- -	- -	- -
	6	"	"	"	18.5-23.5	Silt to silty loam	A-4(8)	5	- -	0	1	81	12	28	5	23
	7	"	"	"	23.5-28.5	"	A-4(9)	7	- -	0	1	81	12	28	5	23
	8	"	"	"	28.5-33.5	Silty clay Loam	A-6(10)	4	- -	0	2	68	23	35	15	20
	9	"	"	"	33.5-38.5	Silty clay w/sand seams	A-6(10)	9	- -	0	2	68	23	35	15	20
	10	"	"	"	38.5-43.5	Sand, gravel&shale frag.	- - - - - -	10	- -	- -	- -	- -	- -	- -	- -	- -
	11	"	"	"	43.5-44.3	Shale	- - - - - -	100	- -	- -	- -	- -	- -	- -	- -	- -
227	1	272+20	25LT	525.4	1.0-3.5	silty clay to silty clay loam	- - - - - -	10	- -	- -	- -	- -	- -	- -	- -	- -
	2	"	"	"	3.5-6.0	"	A-7-6(12)	10	- -	0	3	57	31	41	20	21
	3	"	"	"	6.0-8.5	"	A-7-6(12)	13	- -	0	3	57	31	41	20	21
	4	"	"	"	8.5-13.5	"	- - --- - -	12	- -	- -	- -	- -	- -	- -	- -	- -
	5	"	"	"	13.5-18.5	"	- - - - - -	12	- -	- -	- -	- -	- -	- -	- -	- -
	6	"	"	"	18.5-23.5	silty clay	A-6(11)	4	- -	0	7	55	29	39	19	20
	7	"	"	"	23.5-28.5	"	A-6(11)	5	- -	0	7	55	29	39	19	20
	8	"	"	"	28.5-33.5	silt	A-4(8)	9	- -	0	11	66	17	27	6	21
	9	"	"	"	33.5-38.5	silty clay	A-4(8)	8	- -	0	11	66	17	27	6	21
	10	"	"	"	38.5-43.5	silt & sand	A-4(8)	3	- -	0	11	66	17	27	6	21
	11	"	"	"	43.5-48.5	sand, gravel & lime-stone	- - - - - -	23	- -	- -	- -	- -	- -	- -	- -	- -
	12	"	"	"	48.5-53.5	shale	- - - - - -	100	- -	- -	- -	- -	- -	- -	- -	- -
228	1	266+00	6LT	521.0	0.0-2.0	clay	A-7-6(13)	- -	- -	0	6	41	28	44	20	24
	2	"	"	"	4.0-5.0	clay	A-7-6(14)	- -	- -	0	3	41	27	46	22	24
	3	"	"	"	8.0-9.0	clay	A-7-6(19)	- -	- -	0	3	35	27	55	33	22
	4	"	"	"	12.0-13.0	silty clay	A-6(13)	- -	- -	0	2	51	28	40	23	17

Appendix A8 - Borehole Data for SR 39, 4 Mi. North Little York

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
						Texture	AASHTO			Gravel	Sand	Silt	Clay			
228	5	266+00	6LT	521.0	14.0-15.0	clay loam	A-6(9)	- -	- -	0	26	48	17	27	12	15
	BS-1	266+00	6LT	521.0	3.0-5.0	clay	A-7-6(15)	- -	- -	0	4	39	26	47	23	24
229	1	275+80	CL	521.9	1.0-2.0	clay w/organic matter	A-7-6(16)	- -	- -	0	2	38	32	49	25	24
	2	"	"	"	7.0-8.0	clay	A-7-6(19)	- -	- -	0	1	38	27	55	31	24
	3	"	"	"	15.0-16.0	silty clay	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
230	1	273+00	CL	519.4	5.0-7.0	clay	A-7-6(17)	- -	- -	0	3	48	30	48	29	19
	2	"	"	"	8.0-10.0	"	"	- -	- -	"	"	"	"	"	"	"
	3	"	"	"	13.0-15.0	"	"	- -	- -	"	"	"	"	"	"	"
	4	"	"	"	15.0-17.0	silty clay	A-6(10)	- -	- -	0	1	62	25	37	15	22
	5	"	"	"	20.0-22.0	"	"	- -	- -	"	"	"	"	"	"	"
	6	"	"	"	23.0-25.0	clay	A-7-6	- -	- -	- -	- -	- -	- -	45	22	23
	7	"	"	"	28.0-30.0	sandy clay	- - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
231	- -	262+30	CL	521.8	0.0-4.0	clay	A-7-6	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	4.0-9.0	"	"	- -	- -	- -	- -	- -	- -	- -	- -	- -
232	- -	258+00	CL	521.6	0.0-6.0	clay	A-7-6	- -	- -	- -	- -	- -	- -	- -	- -	- -

Appendix A9 - Borehole Data for SR 56 over L&N Railroad and Highland Creek

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
233	SS-1	70-85	12LT	745.0	1.0-2.5	silty clay w/gravel	- - - - - - -	5	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	3.5-5.0	"	- - - - - - -	2	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	6.0-7.5	"	- - - - - - -	4	- -	- -	- -	- -	- -	- -	- -	- -
	SS-4	"	"	"	8.5-10.0	"	- - - - - - -	4	- -	- -	- -	- -	- -	- -	- -	- -
	SS-5	"	"	"	13.5-15.0	"	- - - - - - -	4	- -	- -	- -	- -	- -	- -	- -	- -
	SS-6	"	"	"	18.5-20.0	clay w/gravel & lime-stone	- - - - - - -	11	- -	- -	- -	- -	- -	- -	- -	- -
	SS-7	"	"	"	23.5-25.0	fragment	- - - - - - -	12	- -	- -	- -	- -	- -	- -	- -	- -
	SS-8	"	"	"	28.5-30.0	"	- - - - - - -	11	- -	- -	- -	- -	- -	- -	- -	- -
	SS-9	"	"	"	33.5-35.0	"	- - - - - - -	17	- -	- -	- -	- -	- -	- -	- -	- -
	SS-10	"	"	"	38.5-38.7	limestone	- - - - - - -	>100	- -	- -	- -	- -	- -	- -	- -	- -
234	SS-1	71+90	25RT	715.7	1.0-2.5	fill	- - - - - - -	7	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	3.5-5.0	"	- - - - - - -	4	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	6.0-7.5	"	- - - - - - -	5	- -	- -	- -	- -	- -	- -	- -	- -
	SS-4	"	"	"	8.5-9.5	clay w/limestone frag. & gravel	- - - - - - -	>100	- -	- -	- -	- -	- -	- -	- -	- -
	NX1	"	"	"	9.5-14.5	limestone	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
235	SS-1	72+69	25LT	707.7	1.0-2.5	silty clay w/limestone frag.	- - - - - - -	>100	- -	- -	- -	- -	- -	- -	- -	- -
	NX1	"	"	"	3.5-8.5	limestone	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
236	SS-1	73+97	13LT	739.0	1.5-3.0	silty clay	- - - - - - -	8	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	4.0-5.5	"	- - - - - - -	8	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	6.5-8.0	"	- - - - - - -	9	- -	- -	- -	- -	- -	- -	- -	- -
	SS-4	"	"	"	8.5-10.0	"	- - - - - - -	10	- -	- -	- -	- -	- -	- -	- -	- -
	SS-5	"	"	"	14.0-15.5	"	- - - - - - -	5	- -	- -	- -	- -	- -	- -	- -	- -
	SS-6	"	"	"	19.0-20.5	clay	- - - - - - -	8	- -	- -	- -	- -	- -	- -	- -	- -
	SS-7	"	"	"	24.0-25.5	"	- - - - - - -	10	- -	- -	- -	- -	- -	- -	- -	- -
	SS-8	"	"	"	29.0-30.5	"	- - - - - - -	11	- -	- -	- -	- -	- -	- -	- -	- -
	SS-9	"	"	"	34.0-35.2	limestone	- - - - - - -	>100	- -	- -	- -	- -	- -	- -	- -	- -

Appendix A9 - Borehole Data for SR 56 over L&N Railroad and Highland Creek

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
237	SS-1	74+13	62RT	714.9	2.0-3.5	silty loam clay	- - - - - - -	14	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	3.5-5.0	"	- - - - - - -	16	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	7.0-8.5	silty clay loam to clay	- - - - - - -	6	- -	- -	- -	- -	- -	- -	- -	- -
	SS-4	"	"	"	9.0-10.5	sand & gravel	- - - - - - -	55	- -	- -	- -	- -	- -	- -	- -	- -
	SS-5	"	"	"	11.2-11.5	"	- - - - - - -	>100	- -	- -	- -	- -	- -	- -	- -	- -
	NX1	"	"	"	11.5-16.5	limestone	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
238	SS-1	71+46	60RT	716.5	1.0-2.5	silty clay w/gravel	- - - - - - -	22	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	3.5-5.0	"	- - - - - - -	8	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	6.0-7.5	"	- - - - - - -	13	- -	- -	- -	- -	- -	- -	- -	- -
	SS-4	"	"	"	8.5-9.1	limestone	- - - - - - -	>100	- -	- -	- -	- -	- -	- -	- -	- -
239	- -	71+82	25LT	715.4	0.0-9.2	silty clay w/gravel	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	9.2	limestone	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
240	- -	72+80	26RT	707.0	0.0-2.0	sandy loam & gravel	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	2.0	limestone	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
241	- -	73+58	60LT	713.1	0.0-8.2	silty clay w/gravel	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	78.2	limestone	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
242	- -	73+58	65RT	713.0	0.0-6.0	silty clay	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	6.0-8.3	silty clay w/gravel	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	"	"	"	8.3	limestone	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Appendix A10 - Borehole Data for SR 56 over Mill Creek

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
243	SS-1	897+71	25RT	727.0	0.0-0.5	fill	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	0.5-1.5	fill	A-4	14	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	2.5-4.0	fill	A-4(4)	19	- -	14	16	59	11	27	18	9
	SS-4	"	"	"	5.0-6.5	fill	"	18	- -	"	"	"	"	"	"	"
	SS-5	"	"	"	7.5-9.0	silty loam	A-4(1)	3	- -	9	27	53	11	24	19	5
	SS-6	"	"	"	10.0-10.5	"	"	- -	-	"	"	"	"	"	"	"
	NXM1	"	"	"	10.5-15.5	limestone w/shale	- - - - - - -	- -	79	- -	- -	- -	- -	- -	- -	- -
244	NXM1	898+49	23LT	716.4	0.5-5.5	limestone w/shale	- - - - - - -	- -	85	- -	- -	- -	- -	- -	- -	- -
	NXM2	"	"	"	5.5-10.5	"	- - - - - - -	- -	98	- -	- -	- -	- -	- -	- -	- -
245	SS-1	898+60	23RT	720.8	0.0-1.0	Topsoil	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	1.0-1.5	Silty Loam	A-4	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	2.5-4.0	Sandy loam& gravel	A-2-4(0)	10	- -	38	27	29	6	24	16	8
	SS-4	"	"	"	5.0-5.5	"	"	>100	- -	- -	- -	- -	- -	- -	-	- -
	NXM1	"	"	"	5.5-10.5	limestone w/shale	- - - - - - -	- -	78	- -	- -	- -	- -	- -	- -	- -
246	SS-1	899+42	29LT	721.7	0.0-1.0	Topsoil	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	1.0-1.5	Silty Loam	A-4	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	2.5-4.0	"	"	- -	- -	- -	- -	- -	- -	- -	- -	- -
	NXM1	"	"	"	4.5-9.5	limestone w/shale	- - - - - - -	- -	[illegible]	- -	- -	- -	- -	- -	- -	- -
247	SS-1	900+00	30LT	723.2	0.0-1.0	Topsoil	- - - - - - -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SS-2	"	"	"	1.0-1.5	silty loam	A-4	- -	- -	- -	- -	- -	- -	- -	- -	- -
	SS-3	"	"	"	2.5-4.0	silty clay loam	A-7-6(25)	11	- -	0	7	66	27	45	20	25

Appendix A11 - Borehole Data for SR 56 over Goose Creek

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
248	SS-1	888+72	24LT	727.6	0.0-1.5	ailty loam	--	26	--	--	--	--	--	--	--	--
	SS-2	"	"	"	2.5-4.0	silty clay loam	--	19	--	--	--	--	--	--	--	--
	SS-3	"	"	"	5.0-6.5	loam	A-6(5)	15	--	--	--	--	--	--	--	--
	SS-4	"	"	"	7.5-9.0	sandy loam & gravel	A-2-6(0)	15	--	48	26	18	8	32	16	16
	SS-5	"	"	"	10.0-11.0	"	"	--	--	"	"	"	"	"	"	"
	SS-6	"	"	"	11.0-11.5	clay	--	--	--	--	-	--	--	--	--	--
	NXM1	"	"	"	11.5-16.5	limestone w/shale	--	--	96	--	--	--	--	--	--	--
249	SS-1	889+10	21RT	719.2	0.0-1.5	sand	A-2-4(0)	1.5	--	23	59	15	3	NP	NP	NP
	SS-2	"	"	"	2.5-3.5	sand	"	--	--	"	"	"	"	NP	NP	NP
	NXM1	"	"	"	3.5-8.5	limestone w/shale	--	--	89	--	--	--	--	--	--	--
	NXM2	"	"	"	8.5-13.5	"	--	--	89	--	--	--	--	--	--	--
250	SS-1	889+39	21LT	719.9	0.0-1.0	loam	A-6	--	--	--	--	--	--	--	--	--
	SS-2	"	"	"	1.0-1.5	sandy loam & gravel	A-2-6	--	--	--	--	--	--	--	--	--
	NXM1	"	"	"	2.5-7.5	limestone	--	--	93	--	--	--	--	--	--	--
251	SS-1	890+00	24RT	727.1	0.0-1.5	fill	--	32	--	--	--	--	--	--	--	--
	SS-2	"	"	"	2.5-4.0	fill	A-6(5)	17	--	--	--	--	--	--	--	--
	SS-3	"	"	"	5.0-6.5	fill	"	20	--	22	21	40	17	29	15	14
	SS-4	"	"	"	7.5-9.0	sandy loam	--	11	>100	--	--	--	--	--	--	--
	SS-5	"	"	"	10.0-10.5	"	--	100	--	--	--	--	--	--	--	--
	NXM1	"	"	"	10.5-15.5	limestone w/shale	--	--	100	--	--	--	--	--	--	--
252	SS-1	891+00	30RT	722.9	0.0-1.5	clay loam w/rock frag.	--	15	--	--	--	--	--	--	--	--
	SS-2	"	"	"	2.5-3.0	"	--	--	--	--	--	--	-	--	--	--

Appendix A12 - Borehole Data for SR 335 over Bear Creek

Boring No.	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
253	1	172+50	15RT	481.4	1.0-2.5	Silty loam	A-6	26	--	--	--	--	--	--	--	--
	2	"	"	"	3.5-5.0	"	"	6	--	--	--	--	--	--	--	--
	3	"	"	"	5.0-5.8	Limestone	-------	>100	--	--	--	--	--	--	--	--
254	BS1	172+50	17RT	481.4	0.5-3.0	silty loam	A-6(6)	--	--	19	20	51	10	34	21	13
255	1	176+00	15RT	480.3	1.0-3.5	silty loam	A-6	9	--	--	--	--	--	--	--	--
	2	"	"	"	3.5-4.8	silty loam to limestone	-------	>100	--	--	--	--	--	--	--	--
256	1	173+10	17RT	481.3	1.0-1.5	silty loam	A-6	>100	--	--	--	--	--	--	--	--
	RUN1	"	"	"	2.8-6.5	limestone	-------	--	0	--	--	--	--	--	--	--
	RUN2	"	"	"	6.5-11.6	limestone	-------	--	82	--	--	--	--	--	--	--
257	RUN1	173+60	17LT	476.0	0.0-5.0	limestone	-------	--	48	--	--	--	--	--	--	--
258	1	174+29	24LT	479.5	1.0-2.2	silty loam	A-6	5	--	--	--	--	--	--	--	--
	2	"	"	"	3.5-4.2	silty loam to limestone	-------	>100	--	--	--	--	--	--	--	--
	RUN1	"	"	"	4.2-9.5	limestone	-------	--	42	--	--	--	--	--	--	--
259	1	173+83	35RT	479.5	1.0-2.2	silty loam	A-6	9	--	--	--	--	--	--	--	--
	2	"	"	"	3.5-4.2	sandy clay loam to limestone	-------	>100	--	--	--	--	--	--	--	--
	RUN1	"	"	"	4.2-9.2	limestone	-------	--	59	--	--	--	--	--	--	--
260	--	173+40	17RT	477.0	0.0-2.0	silty loam	-------	--	--	--	--	--	--	--	--	--
261	--	173+35	26LT	476.0	0.0	rock outcrop	-------	--	--	--	--	--	--	--	--	--
262	--	173+96	17LT	475.0	0.0	rock outcrop	-------	--	--	--	--	--	--	--	--	--
263	--	174+00	35RT	480.0	0.0-4.7	silty loam	-------	--	--	--	--	--	--	--	--	--

APPENDIX B

PHYSICAL AND CHEMICAL PROPERTIES OF AGRIVULTURAL SOILS IN WASHINTON COUNTY (1)

APPENDIX B. PHYSICAL AND CHEMICAL PROPERTIES OF AGRICULTURAL SOILS IN WASHINGTON COUNTY (1)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
AlB------------- Alvin	0-10	10-15	1.45-1.65	2.0-6.0	0.14-0.20	5.1-6.5	Low-----------	0.24	5	3	.5-1
	10-50	15-18	1.45-1.65	0.6-6.0	0.12-0.20	4.5-6.0	Low-----------	0.24			
	50-60	3-10	1.55-1.75	2.0-6.0	0.05-0.13	5.1-7.8	Low-----------	0.24			
AvA------------- Avonburg	0-11	10-18	1.30-1.45	0.6-2.0	0.20-0.24	4.5-7.3	Low-----------	0.43	4	5	.5-2
	11-23	22-30	1.35-1.50	0.6-2.0	0.18-0.20	4.5-5.5	Moderate------	0.43			
	23-80	22-30	1.60-1.85	<0.06	0.06-0.08	4.0-5.5	Moderate------	0.43			
Ba-------------- Bartle	0-8	15-26	1.30-1.45	0.6-2.0	0.20-0.24	5.1-7.3	Low-----------	0.43	4	5	1-3
	8-24	22-35	1.40-1.60	0.6-2.0	0.20-0.22	3.6-7.3	Low-----------	0.43			
	24-50	22-35	1.60-1.80	<0.06	0.06-0.08	4.5-6.0	Low-----------	0.43			
	50-60	22-35	1.40-1.60	0.2-0.6	0.15-0.18	4.5-7.3	Low-----------	0.43			
BdA, BdB, BdC2--- Bedford	0-9	10-16	1.30-1.45	0.6-2.0	0.22-0.24	3.6-6.5	Low-----------	0.43	4	5	1-2
	9-24	20-32	1.30-1.45	0.6-2.0	0.18-0.20	3.6-6.5	Moderate------	0.43			
	24-51	22-35	1.50-1.70	<0.06	0.06-0.08	3.6-5.5	Moderate------	0.43			
	51-80	45-75	1.30-1.50	0.2-0.6	0.06-0.08	3.6-5.5	Moderate------	0.32			
BhF*:											
Berks-----------	0-7	5-23	1.20-1.50	0.6-6.0	0.12-0.17	3.6-6.5	Low-----------	0.24	3	5	.5-3
	7-22	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low-----------	0.17			
	22-31	5-20	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low-----------	0.17			
	31	---	---	---	---	---	-------------	----			
Weikert---------	0-12	15-27	1.20-1.40	2.0-6.0	0.08-0.14	4.5-6.0	Low-----------	0.28	2	8	1-3
	12	---	---	---	---	---	-------------	----			
BmC, BmF--------- Bloomfield	0-6	5-10	1.50-1.70	6.0-20	0.10-0.12	5.1-7.8	Low-----------	0.15	5	2	.5-2
	6-32	2-10	1.60-1.80	6.0-20	0.06-0.11	5.1-7.3	Low-----------	0.15			
	32-65	5-13	1.60-1.80	2.0-20	0.05-0.10	5.1-7.8	Low-----------	0.15			
Bo-------------- Bonnie	0-7	18-27	1.20-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low-----------	0.43	5	6	1-3
	7-42	18-27	1.40-1.60	0.2-0.6	0.20-0.22	4.5-5.5	Low-----------	0.43			
	42-60	18-30	1.45-1.65	0.2-0.6	0.18-0.20	4.5-7.8	Low-----------	0.43			
Br-------------- Bromer	0-15	10-18	1.25-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low-----------	0.43	4	5	2-4
	15-28	20-32	1.40-1.60	0.6-2.0	0.18-0.22	4.5-5.5	Moderate------	0.43			
	28-62	22-34	1.40-1.60	0.06-0.2	0.18-0.22	4.5-6.0	Moderate------	0.43			
	62-80	45-80	1.40-1.65	0.06-0.2	0.03-0.07	4.5-7.3	High----------	0.32			
Bu-------------- Burnside	0-16	20-27	1.20-1.40	0.6-2.0	0.22-0.24	4.5-6.0	Low-----------	0.37	4	5	1-2
	16-50	15-25	1.40-1.60	0.6-2.0	0.10-0.16	4.5-5.5	Low-----------	0.37			
	50	---	---	---	---	---	-------------	----			
CaE2*:											
Caneyville------	0-5	10-25	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low-----------	0.43	3	5	2-4
	5-21	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate------	0.28			
	21-25	40-60	1.35-1.60	0.2-0.6	0.12-0.18	5.0-7.8	Moderate------	0.28			
	25	---	---	---	---	---	-------------	----			
Hagerstown------	0-4	22-27	1.25-1.40	0.6-2.0	0.22-0.24	4.5-6.5	Low-----------	0.32	4	6	1-3
	4-42	35-60	1.35-1.60	0.6-2.0	0.10-0.20	5.1-7.3	Moderate------	0.28			
	42	---	---	---	---	---	-------------	----			
CdF*:											
Caneyville------	0-7	10-25	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low-----------	0.43	3	5	2-4
	7-24	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate------	0.28			
	24	---	---	---	---	---	-------------	----			

APPENDIX B (CONTINUED)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodi-bility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
CdF*:											
Rock outcrop.											
CeD2, CeF--------	0-4	12-24	1.30-1.50	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.32	5	5	1-3
Chetwynd	4-56	18-25	1.40-1.60	0.6-2.0	0.13-0.17	4.5-6.0	Moderate-----	0.32			
	56-80	18-25	1.35-1.60	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.32			
ChB, ChC2--------	0-14	15-25	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	4	6	1-3
Cincinnati	14-24	22-35	1.45-1.65	0.6-2.0	0.15-0.19	4.0-5.5	Low----------	0.37			
	24-50	24-35	1.60-1.85	0.06-0.6	0.08-0.12	4.0-6.5	Moderate-----	0.37			
	50-80	24-40	1.55-1.75	0.06-0.6	0.08-0.12	4.5-7.3	Moderate-----	0.37			
CoB, CoC2, CoD2--	0-6	15-27	1.20-1.40	0.6-2.0	0.19-0.23	5.1-7.3	Low----------	0.32	5	6	2-4
Crider	6-26	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.1-7.3	Low----------	0.28			
	26-80	30-60	1.20-1.55	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-----	0.28			
CrC3, CrD3-------	0-5	27-35	1.20-1.40	0.6-2.0	0.19-0.23	5.1-7.3	Low----------	0.32	4	7	.5-1
Crider	5-26	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.1-7.3	Low----------	0.28			
	26-80	30-60	1.20-1.55	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-----	0.28			
CsC2-------------	0-12	15-27	1.20-1.40	0.6-2.0	0.19-0.23	5.1-7.3	Low----------	0.32	5	6	1-2
Crider	12-39	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.1-7.3	Low----------	0.28			
	39-80	30-60	1.20-1.55	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-----	0.28			
CtD2*:											
Crider-----------	0-5	15-27	1.20-1.40	0.6-2.0	0.19-0.23	5.1-7.3	Low----------	0.32	5	6	1-2
	5-24	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.1-7.3	Low----------	0.28			
	24-80	30-60	1.20-1.55	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-----	0.28			
Frederick--------	0-6	13-27	1.25-1.50	2.0-6.0	0.16-0.24	4.5-6.5	Low----------	0.32	4	6	1-2
	6-18	35-75	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-----	0.24			
	18-60	40-80	1.20-1.50	0.6-2.0	0.10-0.18	4.5-6.5	High---------	0.24			
	60-80	40-80	1.20-1.40	0.6-2.0	0.10-0.20	4.5-6.0	High---------	0.24			
Cu, Cw-----------	0-46	12-18	1.30-1.45	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	5	5	1-3
Cuba	46-60	14-20	1.45-1.65	0.6-2.0	0.19-0.21	4.5-5.5	Low----------	0.37			
DbA--------------	0-8	10-20	1.35-1.45	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.43	4	5	1-3
Dubois	8-22	20-35	1.45-1.65	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.43			
	22-72	16-30	1.75-1.85	<0.06	0.06-0.08	4.5-5.5	Moderate-----	0.43			
	72-80	15-30	1.45-1.65	<0.06	0.06-0.08	4.5-7.3	Moderate-----	0.43			
ElB, ElC2--------	0-6	7-18	1.30-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	.5-2
Elkinsville	6-29	19-30	1.40-1.60	0.6-2.0	0.18-0.22	4.5-5.5	Moderate-----	0.37			
	29-60	16-30	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Moderate-----	0.37			
FwD2-------------	0-6	13-27	1.25-1.50	2.0-6.0	0.16-0.24	4.5-6.5	Low----------	0.32	4	6	1-2
Frederick	6-43	40-80	1.20-1.50	0.6-2.0	0.10-0.18	4.5-6.5	High---------	0.24			
	43-80	40-80	1.20-1.40	0.6-2.0	0.10-0.20	4.5-6.0	High---------	0.24			
FxC2*:											
Frederick--------	0-7	13-27	1.25-1.50	2.0-6.0	0.16-0.24	4.5-6.5	Low----------	0.32	4	6	1-2
	7-19	40-80	1.20-1.50	0.6-2.0	0.10-0.18	4.5-6.5	High---------	0.24			
	19-80	40-80	1.20-1.40	0.6-2.0	0.10-0.20	4.5-6.0	High---------	0.24			
Baxter Variant---	0-7	12-20	1.20-1.50	0.6-2.0	0.07-0.10	5.1-6.5	Low----------	0.28	4	8	1-3
	7-16	18-27	1.35-1.65	0.6-2.0	0.05-0.10	5.1-6.5	Low----------	0.28			
	16-48	40-55	1.40-1.70	0.6-2.0	0.05-0.08	4.5-5.5	Moderate-----	0.28			
	48-61	30-45	1.40-1.70	0.6-2.0	0.06-0.11	4.5-5.5	Moderate-----	0.28			
	61-80	30-40	1.40-1.70	0.6-2.0	0.11-0.14	4.5-5.5	Moderate-----	0.28			

APPENDIX B (CONTINUED)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
GlD2------------ Gilpin	0-5	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low-----------	0.32	3	6	.5-2
	5-31	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low-----------	0.24			
	31-40	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low-----------	0.24			
	40	---	---	---	---	---	-------------	----			
GnF*:											
Gilpin----------	0-3	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-6.0	Low-----------	0.32	3	6	.5-2
	3-30	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-6.0	Low-----------	0.24			
	30	---	---	---	---	---	-------------	----			
Berks-----------	0-4	5-23	1.20-1.50	0.6-6.0	0.12-0.17	3.6-6.5	Low-----------	0.24	3	5	.5-2
	4-24	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low-----------	0.17			
	24	---	---	---	---	---	-------------	----			
GpF*:											
Gilpin----------	0-3	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-6.0	Low-----------	0.32	3	6	.5-2
	3-30	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-6.0	Low-----------	0.24			
	30	---	---	---	---	---	-------------	----			
Berks-----------	0-4	5-23	1.20-1.50	0.6-6.0	0.12-0.17	3.6-6.5	Low-----------	0.24	3	5	.5-3
	4-24	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low-----------	0.17			
	24	---	---	---	---	---	-------------	----			
Ebal------------	0-9	20-28	1.35-1.50	0.6-2.0	0.22-0.24	4.5-6.0	Low-----------	0.37	3	5	.5-2
	9-22	38-50	1.45-1.65	0.2-0.6	0.06-0.09	4.5-6.0	Moderate------	0.28			
	22-64	55-70	1.55-1.75	<0.06	0.07-0.10	4.5-6.0	High----------	0.28			
	64	---	---	---	---	---	-------------	----			
HaC2------------ Hagerstown	0-6	22-27	1.25-1.40	0.6-2.0	0.22-0.24	4.5-6.5	Low-----------	0.32	4	6	1-3
	6-15	35-40	1.30-1.50	0.6-2.0	0.15-0.22	4.5-6.5	Moderate------	0.28			
	15-45	35-60	1.35-1.60	0.6-2.0	0.10-0.20	4.5-7.3	Moderate------	0.28			
	45	---	---	---	---	---	-------------	----			
HcC3------------ Hagerstown	0-7	27-40	1.30-1.45	0.6-2.0	0.21-0.23	4.5-6.5	Low-----------	0.32	4	7	.5-1
	7-45	35-60	1.35-1.60	0.6-2.0	0.10-0.20	4.5-7.3	Moderate------	0.28			
	45	---	---	---	---	---	-------------	----			
HeD2*:											
Hagerstown------	0-5	22-27	1.25-1.40	0.6-2.0	0.22-0.24	4.5-6.5	Low-----------	0.32	4	6	1-3
	5-16	35-40	1.30-1.50	0.6-2.0	0.15-0.22	4.5-6.5	Moderate------	0.28			
	16-44	35-60	1.35-1.60	0.6-2.0	0.10-0.20	4.5-7.3	Moderate------	0.28			
	44	---	---	---	---	---	-------------	----			
Caneyville------	0-5	10-25	1.20-1.40	0.6-2.0	0.15-0.22	4.5-7.3	Low-----------	0.43	3	5	2-4
	5-21	36-60	1.35-1.60	0.2-0.6	0.12-0.18	4.5-7.3	Moderate------	0.28			
	21-30	40-60	1.35-1.60	0.2-0.6	0.12-0.18	5.0-7.8	Moderate------	0.28			
	30	---	---	---	---	---	-------------	----			
HhB------------- Haubstadt	0-8	18-27	1.25-1.40	0.6-2.0	0.18-0.20	4.5-6.5	Low-----------	0.43	3	6	1-3
	8-24	20-35	1.30-1.45	0.6-2.0	0.16-0.19	4.0-5.5	Low-----------	0.43			
	24-40	24-35	1.60-1.80	0.06-0.2	0.12-0.16	4.0-5.5	Moderate------	0.43			
	40-80	18-30	1.55-1.65	0.6-2.0	0.12-0.16	4.5-7.3	Low-----------	0.43			
Hm-------------- Haymond	0-10	10-18	1.30-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.37	5	5	1-3
	10-47	10-18	1.30-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Low-----------	0.37			
	47-60	10-18	1.30-1.45	0.6-2.0	0.20-0.22	4.5-7.3	Low-----------	0.37			
HrD2------------ Hickory	0-9	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low-----------	0.37	5	6	1-2
	9-42	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-6.0	Moderate------	0.37			
	42-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	4.5-8.4	Low-----------	0.37			
MaB------------- Markland	0-7	20-27	1.30-1.45	0.6-2.0	0.22-0.24	5.1-7.3	Low-----------	0.43	3	5	1-3
	7-30	40-55	1.55-1.70	0.06-0.2	0.11-0.13	5.1-7.3	High----------	0.32			
	30-60	35-50	1.55-1.70	0.06-0.2	0.09-0.11	7.4-8.4	High----------	0.32			

APPENDIX B (CONTINUED)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
MgA------------	0-7	22-27	1.35-1.50	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.43	3	5	1-4
McGary	7-34	35-50	1.60-1.75	0.06-0.2	0.11-0.13	5.6-7.8	High---------	0.32			
	34-60	35-50	1.60-1.75	<0.2	0.14-0.16	7.9-8.4	High---------	0.32			
Mo-------------	0-11	35-40	1.35-1.55	0.2-0.6	0.20-0.23	6.1-7.8	High---------	0.37	5	7	3-6
Montgomery	11-37	40-55	1.45-1.65	0.06-0.2	0.11-0.18	6.1-7.8	High---------	0.37			
	37-60	35-48	1.50-1.70	0.06-0.2	0.18-0.20	6.6-8.4	Moderate-----	0.37			
No-------------	0-10	12-27	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43	5	6	2-4
Nolin	10-52	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low----------	0.43			
	52-60	10-30	1.30-1.55	0.6-6.0	0.10-0.23	5.1-8.4	Low----------	0.43			
OtC2-----------	0-6	18-27	1.25-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.43	3	5	.5-2
Otwell	6-22	22-35	1.30-1.45	0.06-0.2	0.18-0.22	4.5-5.5	Low----------	0.43			
	22-48	18-30	1.60-1.80	<0.06	0.06-0.08	4.5-5.5	Moderate-----	0.43			
	48-80	20-30	1.55-1.65	0.06-0.2	0.19-0.21	5.1-7.3	Moderate-----	0.43			
PeA, PeB, PeC2---	0-9	15-26	1.30-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.43	4	5	1-3
Pekin	9-27	25-35	1.40-1.60	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.43			
	27-44	22-30	1.60-1.80	<0.06	0.06-0.08	4.0-6.5	Low----------	0.43			
	44-60	20-34	1.40-1.60	0.6-2.0	0.06-0.08	4.5-7.3	Low----------	0.43			
Pg-------------	0-8	15-26	1.30-1.45	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.43	5	5	1-2
Peoga	8-55	15-34	1.40-1.60	0.06-0.2	0.18-0.20	4.0-5.5	Moderate-----	0.43			
	55-60	20-34	1.40-1.60	0.06-0.2	0.19-0.21	4.5-6.5	Low----------	0.43			
Ph-------------	0-13	12-22	1.25-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.43	5	5	1-3
Peoga	13-32	22-34	1.40-1.60	0.06-0.2	0.18-0.22	4.0-6.5	Low----------	0.43			
	32-80	45-80	1.40-1.65	0.06-0.2	0.03-0.08	4.5-7.3	High---------	0.32			
Pt*.											
Pits											
RsB------------	0-8	13-27	1.35-1.50	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.37	4	6	1-3
Rossmoyne	8-24	22-35	1.40-1.60	0.6-2.0	0.14-0.19	4.5-6.5	Moderate-----	0.37			
	24-54	24-35	1.70-1.90	0.06-0.6	0.06-0.10	4.5-5.5	Moderate-----	0.37			
	54-80	18-45	1.60-1.75	0.06-0.6	0.06-0.10	5.6-8.4	Moderate-----	0.37			
Sf, So----------	0-10	10-25	1.30-1.45	0.6-2.0	0.22-0.24	4.5-6.5	Low----------	0.37	5	5	1-3
Stendal	10-60	18-35	1.45-1.65	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.37			
Wa-------------	0-10	10-17	1.30-1.50	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
Wakeland	10-60	10-17	1.30-1.50	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.37			
WeC2, WeD--------	0-6	13-27	1.30-1.50	0.6-2.0	0.18-0.22	5.1-7.3	Low----------	0.37	4	6	1-3
Wellston	6-21	18-35	1.30-1.65	0.6-2.0	0.17-0.21	4.5-6.5	Low----------	0.37			
	21-37	15-30	1.30-1.60	0.6-2.0	0.12-0.17	4.5-6.0	Low----------	0.37			
	37-52	15-30	1.30-1.60	0.6-2.0	0.06-0.16	4.5-6.0	Low----------	0.20			
	52	---	---	---	---	---	-------------	----			
ZaB, ZaC2--------	0-7	12-27	1.35-1.40	0.6-2.0	0.19-0.23	4.5-7.3	Low----------	0.43	3	6	1-2
Zanesville	7-20	18-35	1.35-1.45	0.6-2.0	0.17-0.22	4.5-7.3	Low----------	0.37			
	20-56	18-33	1.50-1.75	0.06-0.6	0.08-0.12	4.5-5.5	Low----------	0.37			
	56	---	---	---	---	---	-------------	----			
Zp-------------	0-8	30-45	1.40-1.55	0.2-2.0	0.12-0.21	5.6-7.3	High---------	0.28	5	4	1-3
Zipp	8-42	40-55	1.55-1.70	0.06-0.2	0.11-0.13	5.6-7.3	High---------	0.28			
	42-60	40-50	1.55-1.70	0.06-0.2	0.08-0.10	6.6-8.4	High---------	0.28			

APPENDIX C

ENGINEERING INDEX PROPERTIES OF AGRICULTURAL SOILS IN WASHINGTON COUNTY (1)

APPENDIX C. ENGINEERING INDEX PROPERTIES OF AGRICULTURAL SOILS IN WASHINGTON COUNTY (1)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
AlB------------- Alvin	0-10	Fine sandy loam	SM, ML	A-4, A-2	0	100	100	80-95	30-60	<25	NP-4
	10-50	Fine sandy loam, sandy loam, sandy clay loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	100	90-100	20-80	15-38	NP-13
	50-60	Stratified sandy loam to fine sand.	SM, SP, SP-SM	A-2, A-3	0-5	95-100	90-100	70-95	4-35	<20	NP-4
AvA------------- Avonburg	0-11	Silt loam--------	CL, ML, CL-ML	A-4	0	100	100	95-100	75-95	20-30	2-10
	11-23	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	75-95	30-45	10-20
	23-80	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0-3	95-100	95-100	90-100	70-95	30-45	10-20
Ba-------------- Bartle	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	85-100	65-90	20-35	5-15
	8-24	Silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	100	100	90-100	70-90	25-45	5-15
	24-50	Silt loam, silty clay loam, loam.	CL	A-6, A-7	0	100	100	90-100	70-95	30-45	10-25
	50-60	Silty clay loam, silt loam, loam.	CL	A-6, A-7	0	100	100	90-100	70-95	30-45	10-25
BdA, BdB, BdC2--- Bedford	0-9	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	85-95	<25	3-6
	9-24	Silty clay loam, silt loam.	CL	A-6, A-4	0	100	95-100	95-100	85-95	25-40	8-15
	24-51	Silty clay loam, silt loam, cherty silty clay loam.	CL, SC	A-6, A-4	0	90-100	55-95	55-95	45-95	25-40	7-15
	51-80	Silty clay, clay, cherty clay.	CL, CH, SC	A-7	0-5	90-100	55-95	55-95	45-90	45-75	20-35
BhF*:											
Berks-----------	0-7	Silt loam--------	CL, ML, CL-ML	A-4	0-10	80-100	75-100	65-85	50-75	25-36	5-10
	7-22	Channery loam, very channery silt loam, channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	22-31	Channery loam, very channery silt loam, channery loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	31	Weathered bedrock	---	---	---	---	---	---	---	---	---
Weikert---------	0-12	Channery silt loam, very channery silt loam.	GM, ML, SM	A-1, A-2, A-4	0-10	35-70	35-70	25-65	20-55	30-40	4-10
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
BmC, BmF--------- Bloomfield	0-6	Loamy fine sand	SM, SP, SP-SM	A-2-4, A-3	0	100	100	70-90	4-35	---	NP
	6-32	Fine sand, loamy fine sand, sand.	SP, SM, SP-SM	A-2-4, A-3	0	100	100	70-90	4-35	---	NP
	32-65	Fine sand, loamy fine sand, sand.	SM, SP, SP-SM	A-2-4, A-3	0	100	100	65-90	4-35	<20	NP-3

APPENDIX C (CONTINUED)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
Bo---------------- Bonnie	0-7	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	90-100	27-34	8-12
	7-42	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	90-100	27-34	8-12
	42-60	Silt loam, silty clay loam.	CL	A-4, A-6	0	100	100	90-100	80-100	25-39	8-15
Br---------------- Bromer	0-15	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	85-100	20-35	3-13
	15-28	Silt loam, silty clay loam.	CL-ML, CL	A-6, A-4	0	100	95-100	90-100	85-100	25-40	6-20
	28-62	Silty clay loam, silt loam.	CL	A-4, A-6, A-7	0	95-100	90-100	85-100	75-95	30-45	9-24
	62-80	Silty clay, cherty clay, very cherty clay.	CH, GC, CL, SC	A-6, A-7, A-2	0-5	40-70	30-70	25-70	25-65	35-60	15-35
Bu---------------- Burnside	0-16	Silt loam, loam	ML, CL, CL-ML	A-4	0-10	100	100	80-95	75-95	20-35	2-10
	16-50	Channery loam, very channery loam, flaggy silt loam.	SC, GC, SM, GM	A-2, A-4	10-60	35-80	30-60	30-50	26-45	<20	NP-10
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CaE2*: Caneyville-------	0-5	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	5-21	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	21-25	Clay, silty clay	CH	A-7	0-15	90-100	85-100	75-100	65-100	50-75	30-45
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hagerstown-------	0-4	Silt loam--------	CL	A-4, A-6	0-3	90-100	85-100	80-100	60-90	25-32	8-12
	4-42	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0-5	85-100	80-100	75-100	75-95	30-70	15-40
	42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CdF*: Caneyville-------	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	7-24	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
CeD2, CeF--------- Chetwynd	0-4	Loam-------------	CL-ML, CL	A-4, A-6	0	90-100	85-100	75-95	60-95	22-33	4-12
	4-56	Clay loam, sandy clay loam, loam.	SC, CL	A-4, A-6	0	90-100	85-100	70-95	40-75	20-35	8-18
	56-80	Sandy loam, loam, sandy clay loam.	SM-SC, SC, CL-ML, CL	A-2-4, A-2-6, A-4, A-6	0	76-95	65-95	60-90	30-65	20-32	5-15
ChB, ChC2--------- Cincinnati	0-14	Silt loam--------	ML, CL	A-4, A-6	0	100	100	90-100	80-100	25-40	3-16
	14-24	Silty clay loam, loam, silt loam.	CL	A-6, A-4	0	95-100	90-100	90-100	70-100	25-40	8-15
	24-50	Clay loam, silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	95-100	85-95	75-90	65-80	25-40	6-20
	50-80	Clay loam, loam	CL, ML, CL-ML	A-6, A-4	0	95-100	85-95	75-90	65-80	25-40	5-20

APPENDIX C (CONTINUED)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
CoB, CoC2, CoD2-- Crider	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	85-100	25-35	4-12
	6-26	Silt loam, silty clay loam.	CL, ML, CL-ML	A-7, A-6, A-4	0	100	95-100	90-100	85-100	25-42	4-20
	26-80	Silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-5	85-100	75-100	70-100	60-100	35-65	15-40
CrC3, CrD3------- Crider	0-5	Silty clay loam	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	85-100	25-35	4-12
	5-26	Silt loam, silty clay loam.	CL, ML, CL-ML	A-7, A-6, A-4	0	100	95-100	90-100	85-100	25-42	4-20
	26-80	Silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-5	85-100	75-100	70-100	60-100	35-65	15-40
CsC2------------ Crider	0-12	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	85-100	25-35	4-12
	12-39	Silt loam, silty clay loam.	CL, ML, CL-ML	A-7, A-6, A-4	0	100	95-100	90-100	85-100	25-42	4-20
	39-80	Silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-5	85-100	75-100	70-100	60-100	35-65	15-40
CtD2*:											
Crider----------	0-5	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	85-100	25-35	4-12
	5-24	Silt loam, silty clay loam.	CL, ML, CL-ML	A-7, A-6, A-4	0	100	95-100	90-100	85-100	25-42	4-20
	24-80	Silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-5	85-100	75-100	70-100	60-100	35-65	15-40
Frederick-------	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-5	80-100	75-100	75-95	75-90	<35	NP-15
	6-18	Silty clay loam, silty clay, clay.	CH, MH	A-7	0-5	80-100	75-100	70-95	60-90	50-70	20-40
	18-60	Clay, silty clay	CH	A-7	0-5	90-100	85-100	70-100	60-95	60-85	30-55
	60-80	Clay, silty clay	CH	A-7	0-5	90-100	85-100	75-100	65-95	50-75	24-45
Cu, Cw---------- Cuba	0-46	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0	100	95-100	90-100	70-90	25-35	3-12
	46-60	Stratified silt loam to fine sand.	CL, ML, CL-ML	A-4	0	100	80-100	75-100	50-85	15-30	2-10
DbA------------- Dubois	0-8	Silt loam--------	CL-ML, ML, CL	A-4	0	100	100	90-100	70-95	<25	3-8
	8-22	Silt loam, silty clay loam.	CL	A-4, A-6	0	100	100	90-100	80-95	25-35	8-15
	22-72	Silty clay loam, clay loam, silt loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	65-95	20-35	5-15
	72-80	Stratified silt loam and silty clay loam.	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	65-95	20-35	5-15
ElB, ElC2-------- Elkinsville	0-6	Silt loam--------	CL-ML, ML	A-4	0	100	100	90-100	70-90	<25	NP-7
	6-29	Silty clay loam, silt loam.	CL	A-6, A-4	0	100	100	85-100	65-90	20-35	7-15
	29-60	Loam, sandy clay loam, clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	100	90-100	75-100	45-80	20-35	5-15

APPENDIX C (CONTINUED)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
FwD2------------ Frederick	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-5	80-100	75-100	75-95	75-90	<35	NP-15
	6-43	Silty clay loam, clay, silty clay.	CH	A-7	0-5	90-100	85-100	70-100	60-95	60-85	30-55
	43-80	Clay, silty clay	CH	A-7	0-5	90-100	85-100	75-100	65-95	50-75	24-45
FxC2*:											
Frederick-------	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-5	80-100	75-100	75-95	75-90	<35	NP-15
	7-19	Clay, silty clay loam.	CH	A-7	0-5	90-100	85-100	70-100	60-95	60-85	30-55
	19-80	Cherty clay, cherty silty clay loam.	CH	A-7	0-5	90-100	85-100	75-100	65-95	50-75	24-45
Baxter Variant--	0-7	Very cherty silt loam.	GM-GC, GC	A-2, A-4	0-10	40-55	35-50	30-50	25-45	18-25	4-8
	7-16	Very cherty silt loam.	GC	A-2, A-4, A-6	0-10	30-55	25-50	20-50	15-45	23-30	7-11
	16-48	Very cherty clay, cherty clay.	GM, GC	A-7	0-10	45-55	40-50	35-50	35-45	43-56	18-25
	48-61	Cherty silty clay, cherty clay loam.	CL	A-6, A-7	0-10	65-80	60-75	55-75	50-70	34-48	13-22
	61-80	Cherty sandy clay loam, silty clay loam.	CL, SC	A-6, A-7	0-10	70-90	65-85	55-80	25-55	34-43	13-18
GlD2------------ Gilpin	0-5	Silt loam--------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	5-31	Channery silt loam, silt loam, very channery silt loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	31-40	Channery loam, very channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GnF*:											
Gilpin----------	0-3	Loam-------------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	3-30	Channery loam, loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Berks-----------	0-4	Loam-------------	CL, ML, CL-ML	A-4	0-10	80-100	75-100	65-85	50-75	25-36	5-10
	4-24	Channery loam, very channery loam, channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---
GpF*:											
Gilpin----------	0-3	Loam-------------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	3-30	Channery loam, loam, clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

APPENDIX C (CONTINUED)

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
GpF*:											
Berks------------	0-4	Loam--------------	CL, ML, CL-ML	A-4	0-10	80-100	75-100	65-85	50-75	25-36	5-10
	4-24	Channery loam, very channery loam, channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ebal------------	0-9	Silt loam---------	CL-ML, CL	A-4, A-6	0	95-100	95-100	85-100	70-90	25-35	5-15
	9-22	Channery silty clay, channery silty clay loam.	CL, CH, GC	A-7	3-15	60-70	50-70	45-70	40-65	40-55	20-30
	22-64	Clay--------------	CH	A-7	0-3	95-100	90-100	80-100	70-95	60-75	35-45
	64	Weathered bedrock	---	---	---	---	---	---	---	---	---
HaC2------------- Hagerstown	0-6	Silt loam---------	CL	A-4, A-6	0-3	90-100	85-100	80-100	60-90	25-32	8-12
	6-15	Silty clay loam, clay loam.	CL	A-6, A-7	0-3	90-100	85-100	80-100	70-95	38-45	15-20
	15-45	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0-5	85-100	80-100	75-100	75-95	30-70	15-40
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HcC3------------- Hagerstown	0-7	Silty clay loam	CL	A-6, A-7	0-3	90-100	85-100	80-100	75-95	30-45	11-20
	7-45	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0-5	85-100	80-100	75-100	75-95	30-70	15-40
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HeD2*:											
Hagerstown-------	0-5	Silt loam---------	CL	A-4, A-6	0-3	90-100	85-100	80-100	60-90	25-32	8-12
	5-16	Silty clay loam, clay loam.	CL	A-6, A-7	0-3	90-100	85-100	80-100	70-95	38-45	15-20
	16-44	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0-5	85-100	80-100	75-100	75-95	30-70	15-40
	44	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Caneyville-------	0-5	Silt loam---------	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	75-100	60-95	20-35	2-12
	5-21	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-3	90-100	85-100	75-100	65-100	42-70	20-45
	21-30	Clay, silty clay	CH	A-7	0-15	90-100	85-100	75-100	65-100	50-75	30-45
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HhB-------------- Haubstadt	0-8	Silt loam---------	ML, CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	25-40	4-14
	8-24	Silt loam, silty clay loam.	CL, ML	A-6, A-4, A-7	0	100	100	90-100	80-100	25-45	9-19
	24-40	Loam, silt loam, silty clay loam.	CL	A-4, A-6, A-7	0	80-100	75-95	65-90	50-85	25-45	9-19
	40-80	Clay loam, loam, silty clay loam.	CL-ML, CL, GC, SC	A-6, A-4	0	65-90	55-90	50-85	40-75	20-40	4-20
Hm--------------- Haymond	0-10	Silt loam---------	ML	A-4	0	100	100	90-100	80-90	27-36	4-10
	10-47	Silt loam---------	ML	A-4	0	100	100	90-100	80-90	27-36	4-10
	47-60	Fine sandy loam, silt loam, loam.	ML, SM	A-4	0	95-100	90-100	80-100	35-90	27-36	4-10

APPENDIX C (CONTINUED)

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HrD2------------ Hickory	0-9	Silt loam, loam	CL	A-6, A-4	0-5	95-100	90-100	90-100	75-95	20-35	8-15
	9-42	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	95-100	90-100	80-95	65-80	30-50	15-30
	42-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
MaB-------------- Markland	0-7	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	25-35	5-15
	7-30	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	90-95	45-60	19-32
	30-60	Stratified clay to silty clay loam.	CL, CH, ML, MH	A-7	0	100	100	90-100	75-95	40-55	15-25
MgA-------------- McGary	0-7	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-40	5-15
	7-34	Silty clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	90-100	45-60	25-35
	34-60	Stratified silty clay loam to clay.	CL, CH	A-6, A-7	0	95-100	95-100	95-100	85-100	35-55	20-35
Mo--------------- Montgomery	0-11	Silty clay loam	CL	A-7	0	100	100	100	85-100	40-50	20-30
	11-37	Silty clay loam, silty clay.	CH	A-7	0	100	100	95-100	90-100	50-65	30-42
	37-60	Stratified clay to silty clay loam.	CL, CH	A-7	0	100	100	90-100	85-100	40-55	20-32
No--------------- Nolin	0-10	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	10-52	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	100	95-100	85-100	75-100	25-46	5-23
	52-60	Loam, silt loam, gravelly loam.	ML, CL, CL-ML, GM	A-4, A-6	0-10	50-100	50-100	40-95	35-95	<30	NP-15
OtC2------------- Otwell	0-6	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-35	5-15
	6-22	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-40	5-20
	22-48	Silty clay loam, loam, silt loam.	CL	A-6, A-7	0	95-100	95-100	85-100	65-90	35-50	20-30
	48-80	Stratified loam to silty clay.	CL	A-6, A-7	0	95-100	90-100	85-100	65-95	35-50	15-25
PeA, PeB, PeC2--- Pekin	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	85-100	65-100	20-30	5-15
	9-27	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-100	25-40	10-20
	27-44	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	88-98	65-90	25-35	5-15
	44-60	Stratified fine sandy loam to silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	80-95	50-85	20-40	5-15
Pg--------------- Peoga	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	25-40	5-15
	8-55	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	85-100	35-50	20-30
	55-60	Stratified silty clay loam to silt loam.	CL, ML	A-6, A-7	0	100	100	90-100	70-95	35-50	10-25
Ph--------------- Peoga	0-13	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	70-95	20-35	3-11
	13-32	Silt loam, silty clay loam.	CL-ML, CL	A-6, A-4	0	100	95-100	90-100	70-95	25-40	6-20
	32-80	Silty clay, silty clay loam, very cherty clay.	GC, CL, CH, SC	A-7, A-2-7	0-5	45-75	35-75	30-75	30-70	40-65	15-40

APPENDIX C (CONTINUED)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Pt*. Pits											
RsB---------------- Rossmoyne	0-8	Silt loam----------	ML	A-4	0	90-100	90-100	90-100	85-100	30-40	4-10
	8-24	Silty clay loam, silt loam, clay loam.	CL, ML	A-6, A-7, A-4	0	90-100	90-100	85-100	75-95	30-48	8-20
	24-54	Clay loam, loam, silty clay loam.	CL	A-6, A-4	0	90-100	85-95	80-90	70-85	25-40	9-19
	54-80	Clay loam, loam, clay.	CL	A-6, A-7, A-4	0	80-95	70-90	65-85	60-80	25-42	8-20
Sf, So------------- Stendal	0-10	Silt loam----------	CL, CL-ML	A-4, A-6	0	100	100	90-100	75-90	25-40	5-15
	10-60	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	75-90	25-40	5-15
Wa---------------- Wakeland	0-10	Silt loam----------	ML	A-4	0	100	100	90-100	80-90	27-36	4-10
	10-60	Silt loam----------	ML	A-4	0	100	100	90-100	80-90	27-36	4-10
WeC2, WeD--------- Wellston	0-6	Silt loam----------	ML	A-4	0	95-100	90-100	85-100	70-95	25-35	3-10
	6-21	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0-5	75-100	70-100	60-95	60-90	25-40	5-20
	21-37	Silt loam, loam, channery silt loam.	CL-ML, CL, SC, SM-SC	A-4, A-6	0-10	65-90	65-90	60-90	40-65	20-35	5-15
	37-52	Channery silt loam, gravelly sandy loam, channery clay loam.	SM-SC, SC, GM-GC, CL	A-1-b, A-2, A-4, A-6	0-15	60-80	45-75	30-70	15-55	20-35	5-15
	52	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
ZaB, ZaC2--------- Zanesville	0-7	Silt loam----------	CL-ML, CL, ML	A-4, A-6	0	95-100	95-100	90-100	80-100	25-40	4-15
	7-20	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	80-100	25-40	5-20
	20-56	Silt loam, silty clay loam, clay loam.	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	80-100	60-100	20-40	2-20
	56	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Zp---------------- Zipp	0-8	Silty clay---------	CL, CH	A-7, A-6	0	100	100	95-100	90-95	35-55	20-30
	8-42	Clay, silty clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	90-95	45-60	25-35
	42-60	Clay, silty clay	CL, CH	A-7	0	100	100	90-100	75-95	45-60	25-35

APPENDIX D

STATISTICAL STREAM FLOW DATA FOR SELECTED STREAMS IN WASHINGTON COUNTY (39)

APPENDIX D-1. STATISTICAL STREAM FLOW DATA FOR WEST FORK BLUE RIVER (39)

03302680 WEST FORK BLUE RIVER AT SALEM, IN

LOCATION.--Lat 38°36'19", long 86°05'40", in SW¼SE¼ sec.17, T.2 N., R.4 E., Washington County, Hydrologic Unit 05140104, on left bank at downstream side of bridge on East Market Street, 0.35 mi east of County Court House in Salem, 6.0 mi upstream from Hoggatt Branch, and 6.9 mi upstream from mouth.

DRAINAGE AREA.--19.0 mi^2.

PERIOD OF RECORD.--July 1970 to September 1985. Prior to December 10, 1970, nonrecording gage at site 0.55 mi downstream at datum 5.04 ft lower. Low-flow records not equivalent due to effluent from factory entering stream from right bank between sites.

GAGE.--Water-stage recorder. Datum of gage is 713.00 ft above National Geodetic Vertical Datum of 1929.

AVERAGE DISCHARGE.--15 years, 25.0 ft^3/s, 17.87 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,400 ft^3/s May 1, 1983, gage height, 13.14 ft from rating curve extended above 900 ft^3/s by a step-backwater analysis; minimum daily, 0.02 ft^3/s Sept. 24, 1970.

DURATION TABLE OF DAILY MEAN DISCHARGES FOR YEAR ENDING SEPTEMBER 30

CLASS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
YEAR	NUMBER OF DAYS IN CLASS																																		
1971						1	6	9	16	11	19	8	8	17	36	31	24	33	25	18	19	22	20	12	11	3	4	8	3				1		
1972					1	2	11	8	8	10	30	35	19	23	15	22	23	19	19	10	24	23	18	14	7	6	4	5	2	3	1	2	1	1	
1973								2	9	23	14	8	2	8	6	20	18	17	12	21	21	28	34	29	33	24	14	10	4	4	2	2			
1974						8		7	5	5	5	15	9	9	12	5	16	19	27	22	34	29	32	27	23	17	14	15	3	3	2		1	1	
1975			2	3	13	8	13	8	5	3	9	9	7	7	6	5	16	25	17	17	13	33	48	36	20	17	9	5	4	2	2	1	2		
1976									1	5	17	15	12	19	15	21	24	39	36	31	23	32	20	16	11	9	10	4	3	1	1	1			
1977										3	4	10	35	24	29	43	35	23	22	14	13	25	21	19	20	4	11	6	1	2	1				
1978											2	2	3	1	10	21	21	24	43	37	38	43	20	25	26	17	6	13	3	4	3	2			1
1979											2	2	3	3		21	18	37	33	32	33	50	28	24	25	19	13	9	3	2	3	4	1		
1980										1	7	12	9	5	13	12	22	12	39	32	38	52	37	26	19	10	6	6	4	2	2				
1981						3	2	3	7	19	16	14	9	25	36	28	16	19	29	23	30	29	21	19	6	4	5	1		1					
1982								4	7	5	10	16	10	11	10	22	21	24	39	27	34	44	23	19	13	5	7	4	3	1	2	1	1	2	
1983					2	10	27	15	6	6	6	7	4	8	5	5	5	28	23	28	36	33	24	17	17	16	8	13	3	5	3	1	2	1	1
1984			1	3	25	9	13	4	10	4	5	9	9	11	5	13	10	8	14	27	25	21	29	34	21	16	15	5	11	3	3		3		
1985							5	1	3	7	5	12	8	6	15	23	32	32	27	26	24	34	27	22	17	11	7	7	4	4	4		1	1	

CLASS	VALUE	TOTAL	ACCUM	PERCT
0	0.00	0	5479	100.00
1	0.02	0	5479	100.00
2	0.03	3	5479	100.00
3	0.04	6	5476	99.95
4	0.05	41	5470	99.84
5	0.07	41	5429	99.09
6	0.10	77	5388	98.34
7	0.14	61	5311	96.93
8	0.20	77	5250	95.82
9	0.28	102	5173	94.42
10	0.38	151	5071	92.55
11	0.53	174	4920	89.80
12	0.74	147	4746	86.62
13	1.0	177	4599	83.94
14	1.4	213	4422	80.71
15	2.0	292	4209	76.82
16	2.8	301	3917	71.49
17	3.8	359	3616	66.00
18	5.3	405	3257	59.45
19	7.4	365	2852	52.05
20	10.0	405	2487	45.39
21	14.0	498	2082	38.00
22	20.0	402	1584	28.91
23	27.0	339	1182	21.57
24	38.0	269	843	15.39
25	53.0	178	574	10.48
26	73.0	133	396	7.23
27	100.0	111	263	4.80
28	140.0	51	152	2.77
29	200.0	37	101	1.84
30	270.0	29	64	1.17
31	380.0	14	35	0.64
32	520.0	13	21	0.38
33	730.0	6	8	0.15
34	1000.0	2	2	0.04

VALUE EXCEEDED 'P' PERCENT OF TIME

P95 =	0.25
P90 =	0.52
P75 =	2.3
P70 =	3.1
P50 =	8.2
P25 =	23.7
P10 =	55.9

APPENDIX D-1 (CONTINUED)

LOWEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING MARCH 31

YEAR	1	3	7	14	30	60	90	120	183
1972	0.08 8	0.09 6	0.10 5	0.12 4	0.29 3	0.58 4	0.73 3	0.80 1	2.20 1
1973	0.05 4	0.11 7	0.17 7	0.31 8	0.58 7	1.10 7	1.40 7	1.30 2	3.10 5
1974	0.08 5	0.08 4	0.08 4	0.13 5	0.41 6	0.54 3	0.67 2	2.30 8	11.00 8
1975	0.08 6	0.12 8	0.24 8	0.48 9	1.30 11	7.00 12	14.00 14	16.00 13	20.00 14
1976	0.03 1	0.03 1	0.05 1	0.09 2	0.10 2	0.19 2	1.19 6	2.10 6	5.40 7
1977	0.27 10	0.31 10	0.45 11	0.54 10	0.89 9	1.30 8	1.90 9	2.90 9	2.90 3
1978	0.55 13	0.65 13	0.88 13	1.19 13	2.50 13	7.10 13	9.00 13	11.00 11	13.00 10
1979	0.48 12	0.53 12	0.69 12	1.10 12	2.10 12	3.80 10	8.30 11	14.00 12	14.00 11
1980	2.50 14	2.60 14	3.00 14	4.20 14	6.20 14	8.00 14	8.80 12	17.00 14	16.00 12
1981	0.24 9	0.24 9	0.26 9	0.28 6	0.65 8	1.40 9	1.80 8	2.30 7	3.00 4
1982	0.08 7	0.08 5	0.11 6	0.28 7	0.39 5	1.00 6	1.10 4	1.40 5	2.30 2
1983	0.28 11	0.37 11	0.41 10	0.54 11	1.30 10	5.40 11	7.30 10	9.10 10	16.00 13
1984	0.03 2	0.05 3	0.07 3	0.09 3	0.31 4	0.84 5	1.10 5	1.30 3	12.00 9
1985	0.04 3	0.04 2	0.05 2	0.05 1	0.06 1	0.18 1	0.34 1	1.30 4	4.80 6

HIGHEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30

YEAR	1	3	7	15	30	60	90	120	183
1971	522.00 10	241.00 13	175.00 10	112.00 9	77.00 10	49.00 14	41.00 14	34.00 13	24.00 14
1972	963.00 4	654.00 2	407.00 2	256.00 2	137.00 2	91.00 2	69.00 3	54.00 7	38.00 9
1973	481.00 11	265.00 10	174.00 11	129.00 6	92.00 6	78.00 4	62.00 5	55.00 6	51.00 3
1974	789.00 6	382.00 8	202.00 9	108.00 10	75.00 11	56.00 11	54.00 9	48.00 10	44.00 7
1975	700.00 7	417.00 7	210.00 7	107.00 11	86.00 7	71.00 6	68.00 4	62.00 2	51.00 4
1976	460.00 12	247.00 12	149.00 13	85.00 13	68.00 12	58.00 10	48.00 11	40.00 11	31.00 12
1977	281.00 14	161.00 14	117.00 14	75.00 14	63.00 14	54.00 12	42.00 12	32.00 14	27.00 13
1978	1010.00 2	517.00 3	301.00 3	167.00 4	96.00 5	64.00 9	55.00 8	52.00 8	48.00 6
1979	687.00 8	334.00 9	207.00 8	122.00 8	85.00 8	71.00 7	61.00 6	59.00 3	51.00 5
1980	333.00 13	249.00 11	170.00 12	93.00 12	65.00 13	49.00 13	42.00 13	36.00 12	37.00 11
1981	250.00 15	107.00 15	61.00 15	57.00 15	46.00 15	36.00 15	29.00 15	26.00 15	19.00 15
1982	923.00 5	461.00 5	230.00 6	202.00 3	118.00 3	77.00 5	60.00 7	51.00 9	38.00 10
1983	1540.00 1	890.00 1	538.00 1	277.00 1	187.00 1	118.00 1	83.00 1	68.00 1	65.00 1
1984	650.00 9	447.00 6	233.00 5	140.00 5	98.00 4	86.00 3	69.00 2	56.00 4	51.00 2
1985	964.00 3	502.00 4	247.00 4	128.00 7	78.00 9	68.00 8	51.00 10	55.00 5	41.00 8

ANNUAL VALUES

ANNUAL MEAN DISCHARGE AND RANKING
IN YEAR ENDING MARCH 31

1972	9.40 2
1973	32.00 11
1974	26.00 7
1975	36.00 13
1976	22.00 4
1977	11.00 3
1978	29.00 8
1979	32.00 12
1980	29.00 9
1981	9.20 1
1982	23.00 5
1983	25.00 6
1984	40.00 14
1985	30.00 10

ANNUAL MEAN DISCHARGE AND RANKING
IN YEAR ENDING SEPTEMBER 30

1971	14.00 14
1972	20.00 11
1973	31.00 5
1974	31.00 6
1975	28.00 7
1976	18.00 12
1977	16.00 13
1978	32.00 4
1979	33.00 2
1980	22.00 10
1981	11.00 15
1982	25.00 9
1983	36.00 1
1984	32.00 3
1985	28.00 8

APPENDIX D-1 (CONTINUED)

NORMAL MONTHLY MEANS (ALL DAYS)

YEAR	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT
1970	*	*	*	*	*	*	*	*	*	2.48	1.58	0.43
1971	1.97	5.35	14.90	20.30	78.60	21.50	7.45	7.54	2.19	6.98	1.61	0.93
1972	0.85	0.74	6.44	11.90	25.20	41.20	136.00	8.12	0.94	1.44	2.12	5.08
1973	1.20	24.20	68.60	29.90	28.60	82.40	70.50	15.90	14.30	33.00	3.67	0.42
1974	0.67	26.20	25.30	54.50	20.40	51.60	52.50	45.10	21.70	26.00	8.33	33.70
1975	6.17	28.70	30.00	45.80	67.70	73.50	63.00	9.43	5.64	0.42	0.15	4.56
1976	14.90	15.50	36.50	56.70	50.00	9.65	4.21	2.55	11.80	6.85	3.90	1.98
1977	4.46	3.87	2.33	0.97	29.00	56.60	31.10	12.20	7.54	14.40	28.90	4.50
1978	16.60	35.70	69.20	23.00	9.74	92.60	19.30	48.90	8.94	28.70	20.40	6.94
1979	5.60	27.40	70.50	50.20	60.90	34.70	63.40	9.19	10.00	31.60	20.30	14.60
1980	9.68	64.50	31.90	28.00	15.70	46.80	32.30	17.10	5.49	9.88	3.67	1.33
1981	1.96	4.33	4.67	2.48	15.10	12.40	29.90	26.50	27.00	1.22	1.80	1.75
1982	0.90	3.15	13.70	103.00	35.90	34.70	22.00	14.30	11.10	9.15	9.85	40.00
1983	17.30	39.90	75.50	24.00	20.00	11.60	90.60	140.00	9.07	0.33	2.41	0.55
1984	45.70	49.40	37.00	11.70	18.30	73.90	87.90	37.40	1.96	15.80	0.16	0.36
1985	0.82	13.10	55.60	28.20	56.60	69.00	16.60	6.02	38.00	17.20	30.50	1.96

	OCT	NOV	DEC	JAN	FEB	MARCH
TWENTY FIFTH PERCENTILE	0.90	4.33	13.70	11.90	18.30	21.50
FIFTIETH PERCENTILE	4.46	24.19	31.90	28.00	28.60	46.80
SEVENTY FIFTH PERCENTILE	14.90	35.70	68.60	50.20	56.60	73.50

	APRIL	MAY	JUNE	JULY	AUG	SEPT
TWENTY FIFTH PERCENTILE	19.30	8.12	5.49	1.70	1.66	0.65
FIFTIETH PERCENTILE	32.30	14.30	9.07	9.51	3.67	1.97
SEVENTY FIFTH PERCENTILE	70.50	37.40	14.30	23.80	17.69	6.47

APPENDIX D-2. STATISTICAL STREAM FLOW DATA FOR BLUE RIVER (39)

03302800 BLUE RIVER AT FREDERICKSBURG, IN

LOCATION.--Lat 38°26'02", long 86°11'31", in NE¼NW¼ sec.16, T.1 S., R.3 E., Washington County, Hydrologic Unit 05140104, on downstream side of bridge on U.S. Highway 150 at Fredericksburg, 0.5 mi downstream from South Fork Blue River, and at mile 57.1.

DRAINAGE AREA.--283 mi^2, of which 76.9 mi^2 does not contribute directly to surface runoff.

PERIOD OF RECORD.--June 1968 to September 1985.

GAGE.--Water-stage recorder. Datum of gage is 590.00 ft above National Geodetic Vertical Datum of 1929.

AVERAGE DISCHARGE.--17 years, 342 ft^3/s, 16.41 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,500 ft^3/s May 2, 1983, gage height, 24.37 ft; minimum daily, 6.1 ft^3/s Oct. 18, 1968.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Jan. 21, 1959, reached a stage of 29.20 ft, from floodmark, on left upstream wingwall.

DURATION TABLE OF DAILY MEAN DISCHARGES FOR YEAR ENDING SEPTEMBER 30

CLASS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
YEAR	NUMBER OF DAYS IN CLASS																																		
1969		3	13	27	16	17	11	18	11	10	10	23	19	22	24	26	16	24	13	9	12	12	8	5	1	7	1	1	1	3	1			1	
1970			12	27	17	14	19	17	14	16	11	14	22	11	21	20	19	22	19	10	18	10	12	4	5	1		4	1	2	1	1	1		
1971		1	3	6	11	13	11	8	12	25	27	33	23	22	20	28	20	17	15	22	7	11	5	10	4	5	3		1	1			1		
1972		3	7	6	19	32	16	22	25	20	19	9	19	10	14	21	18	22	15	16	12	10	5	7	3	4	3	2	4	1	1		1		
1973			3	6	17	18	7	6	9	6	9	8	14	20	13	28	20	28	33	23	25	18	20	7	6	10	3	3	3		1		1		
1974			2	7	11	22	14	7	15	20	9	20	11	15	21	29	16	21	24	14	17	16	15	13	9	3	5	4	2	2	1				
1975			9	4	17	24	18	10	6	16	11	8	13	14	11	16	14	27	34	29	15	18	13	14	6	4	3	1	3		4		1	1	1
1976			4	7	9	16	7	15	23	21	29	16	21	14	23	29	22	23	15	13	16	12	5	9	5	3	2	2	2	1		1	1		
1977		1	8	26	14	23	12	16	33	21	18	16	9	17	15	13	17	16	13	14	16	14	8	10	3	4	4	3		1					
1978									8	14	19	21	22	30	39	31	19	24	24	16	22	16	19	10	8	7	7	1	2		4	1		1	
1979							5	4	11	15	15	14	24	21	22	27	26	23	29	21	21	17	16	13	9	7	6	4	3	4	3	2	3		
1980					2	8	11	15	8	12	13	25	.19	16	22	24	20	29	29	25	18	18	13	13	8	4	3	4	3	2	1		1		
1981			5	4	13	14	27	39	39	23	26	20	13	21	16	18	17	16	16	8	11	5	5	3	4		1	1							
1982					5	16	19	26	23	20	18	22	26	19	16	12	14	21	25	16	15	10	13	8	4	5	2	4	1	1		1	1	2	
1983		2	13	8	10	13	16	13	8	22	15	11	7	15	19	27	19	22	23	12	17	14	13	17	3	9	2	3	1	2	6		1	1	1
1984		3	15	7	15	10	20	14	22	12	7	10	12	5	15	23	24	35	21	14	19	15	15	7	7	6	6	3	2		1			1	
1985			4	10	11	9	10	11	15	11	18	18	30	19	24	17	22	15	23	15	25	17	8	10	4	8	1	1	5	1		1	1	1	

CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT
0	0.0	0	6209	100.00	12	72.0	304	3925	63.21	24	1100.0	89	378	6.09
1	6.1	13	6209	100.00	13	90.0	291	3621	58.32	25	1300.0	87	289	4.65
2	7.6	98	6196	99.79	14	110.0	335	3330	53.63	26	1700.0	52	202	3.25
3	9.6	145	6098	98.21	15	140.0	389	2995	48.24	27	2100.0	41	150	2.42
4	12.0	187	5953	95.88	16	180.0	323	2606	41.97	28	2600.0	34	109	1.76
5	15.0	249	5766	92.87	17	220.0	385	2283	36.77	29	3300.0	21	75	1.21
6	19.0	223	5517	88.85	18	280.0	371	1898	30.57	30	4100.0	24	54	0.87
7	23.0	241	5294	85.26	19	350.0	277	1527	24.59	31	5100.0	7	30	0.48
8	29.0	282	5053	81.38	20	430.0	286	1250	20.13	32	6400.0	13	23	0.37
9	37.0	284	4771	76.84	21	540.0	233	964	15.53	33	8000.0	8	10	0.16
10	46.0	274	4487	72.27	22	680.0	193	731	11.77	34	10000.0	2	2	0.03
11	57.0	288	4213	67.85	23	850.0	160	538	8.66					

VALUE EXCEEDED 'P' PERCENT OF TIME

P95 =	12.9
P90 =	17.9
P75 =	40.6
P70 =	51.7
P50 =	130.0
P25 =	345.0
P10 =	777.0

APPENDIX D-2 (CONTINUED)

LOWEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING MARCH 31

YEAR	1	3	7	14	30	60	90	120	183
1970	7.90 8	8.30 7	8.80 5	9.00 4	10.00 1	11.00 1	20.00 1	35.00 7	53.00 5
1971	10.00 10	11.00 10	12.00 10	14.00 10	16.00 8	47.00 10	53.00 10	59.00 10	81.00 9
1972	7.50 5	8.60 8	11.00 9	13.00 9	17.00 9	52.00 11	72.00 11	69.00 11	78.00 8
1973	6.60 1	6.80 1	7.80 2	8.90 2	14.00 5	26.00 8	29.00 8	31.00 4	52.00 4
1974	7.90 9	9.10 9	9.90 8	11.00 7	15.00 6	19.00 6	21.00 4	49.00 9	182.00 13
1975	12.00 11	13.00 11	14.00 11	20.00 13	28.00 13	59.00 13	87.00 12	106.00 12	156.00 12
1976	7.80 7	8.10 5	9.50 7	11.00 8	16.00 7	17.00 5	21.00 5	28.00 1	68.00 7
1977	7.10 3	8.10 6	8.40 3	10.00 5	11.00 2	16.00 3	23.00 6	34.00 5	32.00 1
1978	15.00 14	15.00 14	18.00 14	32.00 15	59.00 15	123.00 15	153.00 15	209.00 15	201.00 15
1979	20.00 15	20.00 15	22.00 15	29.00 14	52.00 14	59.00 14	114.00 14	201.00 14	199.00 14
1980	35.00 16	37.00 16	43.00 16	58.00 16	93.00 16	176.00 16	183.00 16	307.00 16	285.00 16
1981	7.60 6	7.90 4	9.20 6	11.00 6	17.00 10	24.00 7	29.00 7	34.00 6	37.00 2
1982	12.00 12	13.00 12	14.00 12	18.00 11	22.00 11	27.00 9	37.00 9	42.00 8	49.00 3
1983	14.00 13	15.00 13	15.00 13	18.00 12	24.00 12	55.00 12	99.00 13	112.00 13	139.00 11
1984	6.70 2	7.30 2	7.70 1	8.90 3	12.00 4	17.00 4	20.00 2	29.00 2	129.00 10
1985	7.30 4	7.40 3	8.40 4	8.60 1	11.00 3	14.00 2	20.00 3	29.00 3	60.00 6

HIGHEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30

YEAR	1	3	7	15	30	60	90	120	183
1969	8470.00 7	5570.00 6	3050.00 8	1980.00 6	1290.00 7	861.00 11	649.00 14	573.00 13	482.00 13
1970	6780.00 12	3660.00 14	2030.00 13	1360.00 12	1040.00 12	950.00 6	800.00 6	685.00 7	517.00 11
1971	6940.00 11	3950.00 11	2440.00 10	1630.00 10	1120.00 9	726.00 15	630.00 15	527.00 15	427.00 14
1972	6560.00 13	4340.00 9	3310.00 4	2320.00 3	1320.00 3	1030.00 5	831.00 5	683.00 8	515.00 12
1973	7420.00 8	3770.00 12	1950.00 14	1400.00 11	1020.00 13	900.00 9	709.00 10	616.00 11	584.00 8
1974	4950.00 15	2730.00 15	1740.00 15	1280.00 15	1090.00 10	801.00 14	770.00 7	681.00 9	558.00 10
1975	10000.00 2	6490.00 3	3300.00 5	1840.00 7	1310.00 5	1150.00 4	1060.00 1	971.00 1	766.00 3
1976	6980.00 10	3700.00 13	2310.00 11	1300.00 14	992.00 14	807.00 13	666.00 13	546.00 14	421.00 15
1977	3470.00 16	2330.00 16	1320.00 16	959.00 16	821.00 16	692.00 16	597.00 16	470.00 16	409.00 16
1978	9600.00 4	5920.00 5	3610.00 2	2080.00 4	1320.00 4	838.00 12	706.00 11	722.00 6	651.00 4
1979	7040.00 9	4530.00 7	3130.00 6	2030.00 5	1300.00 6	1220.00 2	959.00 4	926.00 2	828.00 2
1980	6490.00 14	4490.00 8	2990.00 9	1680.00 8	1150.00 8	906.00 8	761.00 8	632.00 10	630.00 5
1981	2220.00 17	1390.00 17	856.00 17	717.00 17	620.00 17	458.00 17	394.00 17	346.00 17	251.00 17
1982	9900.00 3	6930.00 2	3320.00 3	2900.00 2	1750.00 2	1210.00 3	985.00 3	842.00 4	615.00 6
1983	10800.00 1	8820.00 1	5490.00 1	2940.00 1	2110.00 1	1460.00 1	1040.00 2	854.00 3	832.00 1
1984	8580.00 6	4230.00 10	2100.00 12	1310.00 13	947.00 15	880.00 10	715.00 9	610.00 12	570.00 9
1985	8870.00 5	6130.00 4	3070.00 7	1660.00 9	1040.00 11	938.00 7	690.00 12	760.00 5	592.00 7

ANNUAL VALUES

ANNUAL MEAN DISCHARGE AND RANKING IN YEAR ENDING MARCH 31

1970	221.00 4
1971	341.00 7
1972	214.00 3
1973	359.00 8
1974	374.00 10
1975	444.00 13
1976	321.00 6
1977	184.00 2
1978	425.00 12
1979	467.00 14
1980	507.00 16
1981	150.00 1
1982	366.00 9
1983	302.00 5
1984	474.00 15
1985	378.00 11

ANNUAL MEAN DISCHARGE AND RANKING IN YEAR ENDING SEPTEMBER 30

1969	267.00 14
1970	285.00 11
1971	255.00 15
1972	278.00 13
1973	390.00 6
1974	352.00 9
1975	422.00 4
1976	281.00 12
1977	241.00 16
1978	437.00 3
1979	544.00 1
1980	390.00 5
1981	148.00 17
1982	356.00 8
1983	463.00 2
1984	340.00 10
1985	366.00 7

APPENDIX D-2 (CONTINUED)

NORMAL MONTHLY MEANS (ALL DAYS)

YEAR	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT
1968	*	*	*	*	*	*	*	*	138.00	49.70	89.30	24.20
1969	9.98	45.60	458.00	1017.0	433.00	142.00	487.00	341.00	94.80	96.10	53.00	26.00
1970	11.00	53.10	90.00	172.00	342.00	888.00	977.00	453.00	282.00	36.50	101.00	29.90
1971	67.40	141.00	268.00	329.00	1136.0	355.00	148.00	323.00	79.60	92.70	50.90	139.00
1972	68.30	36.90	220.00	287.00	454.00	666.00	1280.0	205.00	33.20	26.80	45.10	29.90
1973	22.50	342.00	722.00	354.00	314.00	937.00	830.00	213.00	254.00	588.00	81.00	15.30
1974	22.70	345.00	301.00	775.00	322.00	736.00	749.00	358.00	272.00	86.50	70.10	190.00
1975	76.60	302.00	397.00	680.00	1002.0	1189.0	993.00	301.00	104.00	19.60	18.80	28.10
1976	99.60	152.00	441.00	781.00	767.00	170.00	86.80	114.00	594.00	124.00	44.80	23.20
1977	42.10	50.80	29.40	11.60	295.00	802.00	467.00	280.00	195.00	175.00	463.00	82.40
1978	181.00	533.00	998.00	353.00	137.00	1193.0	313.00	564.00	139.00	345.00	305.00	129.00
1979	74.70	410.00	994.00	814.00	969.00	566.00	1150.0	194.00	306.00	587.00	264.00	239.00
1980	114.00	1135.0	608.00	514.00	237.00	748.00	543.00	380.00	128.00	206.00	43.40	22.10
1981	37.60	46.70	49.50	23.90	163.00	157.00	423.00	394.00	341.00	44.40	42.40	59.00
1982	28.90	43.00	208.00	1341.0	788.00	695.00	427.00	186.00	207.00	87.80	48.60	230.00
1983	123.00	429.00	1013.0	378.00	302.00	190.00	1045.0	1808.0	170.00	29.60	26.70	15.50
1984	305.00	529.00	477.00	207.00	260.00	798.00	811.00	502.00	51.00	99.10	27.70	14.90
1985	17.80	204.00	758.00	427.00	780.00	871.00	364.00	158.00	512.00	161.00	142.00	21.60

	OCT	NOV	DEC	JAN	FEB	MARCH
TWENTY FIFTH PERCENTILE	22.60	48.70	214.00	247.00	278.00	273.00
FIFTIETH PERCENTILE	67.40	204.00	441.00	378.00	342.00	736.00
SEVENTY FIFTH PERCENTILE	107.00	420.00	740.00	778.00	784.00	880.00

	APRIL	MAY	JUNE	JULY	AUG	SEPT
TWENTY FIFTH PERCENTILE	394.00	200.00	102.00	42.40	43.10	22.00
FIFTIETH PERCENTILE	543.00	323.00	183.00	94.40	51.90	29.00
SEVENTY FIFTH PERCENTILE	985.00	424.00	288.00	183.00	111.00	132.00

COVER DESIGN BY ALDO GIORGINI